STATE GOVERNMENT

SEP 3 0 1946

MANAGING OUR RIVERS

In This Issue

Developing America's Rivers

IN FEBRUARY, 1945, STATE GOVERNMENT devoted an entire issue to the use and control of river resources, treating some of the problems common to most river basins. The September, 1946 issue approaches the development of river resources from the viewpoint of several of the major interstate rivers. Because responsibility for America's waterways is divided between a number of federal agencies and the states, the problem of developing consistent policies and devising coordinated administrative machinery to effectuate them underlies all other problems of river development. Abel Wolman, of Johns Hopkins University and member of the Maryland Commission on Postwar Reconstruction and Development, emphasizes the need for a coherent water policy recalling the proposals of Senator Newlands nearly forty years ago to create an over-all reviewing agency with respect to the conservation and use of waterways (page 215).

Ten River Basins

REPRESENTATIVE of America's great river systems are the ten interstate rivers whose development is discussed in this issue: THE CONNECTICUT by General Sanford H. Wadhams, Chairman of the Connecticut Commission on Intergovernmental Cooperation (page 218); THE DELAWARE by Ellwood J. Turner, Chairman of Interstate Commission on the Delaware River Basin (page 220); THE POTOMAC by Senator L. Harold Sothoron of Maryland, Chairman of Interstate Commission on the Potomac River Basin (page 222); THE SAVANNAH by G. T. Papageorge, Director of Public Works Panel, Agricultural and Industrial Development Board of Georgia (page 224); THE LOWER MISSISSIPPI by Caye A. Nelson, Executive Director of Economic Development Committee of Louisiana (page 226); THE TENNESSEE by Paul S. Mathes, Tennessee Commissioner of Conservation (page 228); THE OHIO by Frank L. Raschig, Director of Department of Public Works of Ohio (page 230); THE MISSOURI by Governor M. Q. Sharpe of South Dakota (page 232); THE COLORADO by Clifford H. Stone, Director of the Water Conservation Board of Colorado (page 234); and THE COLUMBIA by George K. Aiken, Budget Director of Oregon, and Charles E. Strickland, State Engineer of Oregon (page 237).

Selection of these ten rivers should not suggest that important problems and projects are not to be found in other river basins. Current activities in the Arkansas Valley are noted in *Around The States* (page 240).

A Program of Balanced Development

A NUMBER of general observations may be drawn from the articles in this issue. There is a growing awareness among the states that the public interest requires the full and balanced utilization of water resources. The traditional practice of approaching flood control, pollution abatement, industrial and domestic water use, navigation, water power, irrigation, fisheries, and recreation as distinct and separate problems has led to uneconomic expenditure of public funds and has been the cause of much of the conflict and frustration which has defeated full utilization and development of our rivers. Increasingly there is emphasis on programs of water utilization which take into account all the interests which all of the people have in rivers.

There is growing appreciation of the inter-relationships between water utilization and problems of land use generally. Although conservationists have long recognized that what happens to the land affects water and what happens to water affects land, practical application of this realization has been slow. The importance of effective soil conservation, good forest practice, and controlled grazing to any program of river basin development is beginning to receive recognition. For example, the problem of flood control can be simplified greatly, and the cost of construction and maintenance of flood control works much reduced, by state and local policies and zoning regulations which recognize the most economical long-term use of river flood plains.

River development projects designed without regard to related land-use factors cannot answer adequately public needs. Neither can regional river basin developments be wisely undertaken until their relation to contiguous watersheds and to the national economy as a whole has been fully considered. The relative importance of water power, flood control, navigation, pollution abatement, or irrigation differs among river basins in accordance with regional factors. But without balanced planning through cooperative coordinating machinery of some sort, those uses for which group demand is best organized and most articulate are likely to receive attention disproportionate to the benefits resulting to the people of the river valley generally. Special purpose development of America's rivers has been tried and found inadequate to meet the broader aspects of public need. Coordinated development of all the uses of our rivers with due regards for regional needs and national interests is the emerging objective of river basin development.

Staff Change

AS OF SEPTEMBER 1st Brevard E. Crihfield became Regional Representative of the Council at the Central Office in Chicago. Newton Edwards succeeds Mr. Crihfield as Washington Representative in the Washington office.

On the Cover

PHOTOGRAPH of the Mississippi River Locks at Rock Island, Illinois courtesy War Department, Corps of Engineers.

Per. room

STATE GOVERNMENT

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UNTIL the work of river improvement is undertaken in a modern way it can not have results that will meet the needs of this modern nation. These needs should be met without further dilly-dallying or delay. The plan which promises the best and quickest results is that of a permanent commission authorized to coordinate the work of all the Government departments relating to waterways, and to frame and supervise the execution of a comprehensive plan. Under such a commission the actual work of construction might be entrusted to the reclamation service; or to the military engineers acting with a sufficient number of civilians to continue the work in time of war; or it might be divided between the reclamation service and the corps of engineers. . . . The essential thing is that the work should go forward under the best possible plan, and with the least possible delay. We should have a new type of work and a new organization for planning and directing it. The time for playing with our waterways is past. The country demands results.

THEODORE ROOSEVELT
Special Message to Congress,
December 8, 1908

Wanted—A National Water Policy

By Abel Wolman

The Johns Hopkins University

When President Theodore Roosevelt in 1907 called the Governors of the states to Washington "to consider the question of the conservation and use of the great fundamental sources of wealth of this nation," he pointed out that America for a century had managed to mismanage all of its river systems.

Almost forty years have elapsed since that first effort to interest and to include the states in an organized effort to develop these resources on a more integrated basis than had prevailed before. When we take stock today of the events that have occurred since that time we are startled to discover that so far as organized integration is concerned the situation does not differ materially from that in 1907. Many people will hasten to draw our attention to the vast expenditures for various purposes in river control as an indication of the great progress that has been made. Important as these construction efforts have been they still do not answer the question of whether or not our programs for development of water resources and the policies which led them into being are any better interrelated today than they were almost half a century ago.

In this same interval important changes in the water resources field have taken place. These changes have covered virtually all of the fields of public and private activity. In the first place, the ideas regarding development of river basins have undergone elaborate evolution. Single purpose activity on a river system or on any individual part thereof has gradually given way to multiple use conceptions. Basin development as a whole has become more and more the intelligent basis for activity. Each of these technological changes, implicitly correct in their purposes, gives rise to major problems and confusions within the federal structure and to even a greater extent within the framework of state-federal relationships.

Geographically, the extent of the issues and of the objectives has increased, so that today no single part of the country is in such undeveloped or overdeveloped state as to require neither thought nor action.

The organizational structures on both the federal and the state level have become so complex that even suggestions as to integration lead to renewed confusions in argument. Well over thirty federal agencies are now concerned with the development of water, land, and mineral resources. Their functions are interrelated in many major fashions. As far as we have been able to discover no provision for integrating their correlative and competitive functions has so far been made in our federal structure.

The Department of the Interior, the Department of Agriculture, the Federal Power Commission, the U. S. Public Health Service, the Weather Bureau, the Coast and Geodetic Survey, the Tennessee Valley Authority, the Inland Waterways Corporation, the Mississippi River Commission, the State Department (through the International Boundary Water Commission, United States and Mexico; and the International Joint Commission, United States and Canada), and the Navy Department, all, together with their multiple subdivisions, concern themselves with one phase or another of water development.

A list of the individual functions of these principal agencies and their many subdivisions merely adds to the conviction that overlapping as well as competition in these functions is a necessary consequence of the hybrid federal structure.

It is not surprising, of course, that such difficulties have arisen. They stem not only from the evolutionary changes in technology during the last forty years, but from the increasing recognition by Congress and by the states of the important national interests involved in river development.

Unfortunately neither Congress nor the states have recognized that in the expansion of these functions little or no definitive thought has been devoted to coordinating the activities as they were assigned in increasing degree to existing federal and state agencies. Jurisdictional disputes, for example, are almost a necessary consequence of the Congressional policy of allocating to several individual federal agencies the same or similar functions, without considering that both in legislation and in administration their policies are in conflict on every level of water resources development. It thus comes about that sometimes four or five agencies are covering the same territory for the same purposes. Not infrequently they arrive at conclusions that are diametrically opposed to each other.

This confusion, of course, is extended into the whole field of repayment for water resources projects. Even within the same agency every conceivable range of repayment policy is used. When this issue is extended again to differences between the agen-

cies, the confusion is even greater. Many if not all of these inconsistencies in application are inherent in the basic laws passed by the Congress. Either these inconsistencies are not apparent to Congressional committees or they must appear to be less consequential than they actually are in application.

The extension of national interest in turn has brought with it a great intrusion of federal money into many enterprises that in earlier years had been considered to be the major responsibilities of the states. In the movement toward increased federal assumption of responsibility for design, construction, and participation in funds, the states, of course, have not been wholly without fault. Many undertakings have been pushed by state forces, merely because they were to be federally financed. Even limited state contributions would not have been forthcoming for some of these projects if they had been scrutinized from the angle of actual local contribution of funds. This state of mind, of course, is not restricted to the field of water resources. It is part of a nation-wide movement towards federal financing. The states, however, cannot insist, as many of them do, on the preservation of state autonomies in these directions as long as the same people who so insist take the next train to Washington to see how much can be withdrawn from the federal treasury for their local communities. As long as state autonomy is unsupported by state responsibility, both technical and financial, the issue will remain unresolved. At some point the states must accept the thesis that the agency that issues the money must of necessity assume a responsibility for its expenditure.

At the moment, we have a fresh illustration of the trend away from state control fostered by many individuals who carry the banner of states' rights. This is in the field of stream pollution abatement, a subject with which Congress has been struggling for well over fifteen years. Many people feel that this problem can only be solved by the extension of federal grants to individual local communities in order to stimulate the rate of installation of sewage treatment plants. Obviously, if people advocate such action they must expect that a necessary accompaniment thereof will be the gradual assumption by the Federal government of major responsibilities in this field, responsibilities which hitherto have been almost exclusively the function of the individual states. This belief that money coming from the Federal government is not money of the people in every state accounts for the rush in each new field toward federal subsidy. Criticism of this procedure is peculiarly appropriate at this time in view of the fact that surplus funds in the states are at their highest level, variously estimated at the moment as about $5,000,000,000. If the states sincerely insist upon the preservation of their autonomy and responsibility, a good place to begin to exercise these is in the field I have just mentioned.

California, for example, has recently appropriated something over $90,000,000 for grants and aids to local subdivisions for public works construction. It has allocated to the city of Los Angeles for purposes of sewage disposal some $13,000,000.

The Elements of a Sound National Water Policy

For many years it was apparent that general agreement might be reached on the elements essential to the development of a national water policy. Such a policy should

(1) provide for the preparation of plans for the unified regulation and development of the river systems of the country;

(2) provide for definite and effective programs for construction of the projects included in such plans, the programs to be prosecuted as rapidly as practicable;

(3) provide that programs be made adjustable to the exigencies of unemployment relief in periods of business depression and of defense in times of danger;

(4) take proper account of social, general, and potential benefits, as well as economic, special, and existing benefits, in considering specific projects;

(5) limit federal contributions toward projects to amounts warranted by all the national interests involved;

(6) provide in so far as practicable for an equitable distribution of project costs;

(7) assist in the settlement of controversies between or among states over interstate waters;

(8) provide for systematic and effective cooperation among federal agencies and between such agencies, and agencies and individuals in the several states in formulating water plans and programs; and

(9) eliminate inconsistencies and conflicts between or among existing laws and regulations relating to the control or utilization of water resources.

In general terms these elements of a national water policy are simple and probably completely satisfactory to all levels of government. As a matter of fact, in our national history certain aborted efforts in the direction of implementing these policies have been taken from time to time. Many years ago, Senator Newlands recognized the rising confusion on the federal level of resources development. He was aware, for example, that in the structure of the Federal government neither the Cabinet nor the Congressional committees were able, from the standpoint of their normal current activities and in the absence of technological aid, to perform the function of integration in a continuing and orderly fashion. It is probably true that this same criticism could be sustained today. He took steps, against

great opposition, to provide for coordination through legislative means. He succeeded in the creation of an agency whose functions were primarily those of integration and of comprehensive review.

The interposition of such an agency between the existing functioning agencies and the Congressional committees was as unpopular then with some forces as it has been ever since. The life of this integrating agency was short. The historical evidence indicates that its death was assured by those groups which prefer to operate singly and directly through Congressional committees without any effort at over-all integration.

The Road to Implementing a National Water Policy

On the Federal Level. The challenge to the student of administration in the field of water resources development is as complex and perhaps as important as any with which he may be confronted. Federal agency operation in this field is eternally confronted with a long series of administrative problems. Their mere enumeration discloses some of the difficulties that have hitherto prevented the implementation of a national policy. They are, at least in part:

1. Competition for the use of resources for different purposes.
2. Competition between the states for allocations.
3. Competition between the states and the Federal government on the general question of allocation and rights.
4. Competition between public and private interests, with particular reference to power, limitations on acreage for irrigation, navigation competition with other forms of transportation, etc.
5. Conflicting state laws relating to resources.
6. Almost complete lack of objective procedures for coordination between federal agencies.
7. Almost complete lack of means for coordination between states.
8. The absence of effective means of affording participation of local interests in the development of plans.
9. Practically no means of coordinating the developments between basins and regions.

There have been many suggestions as to types of machinery for overcoming some or all of these major difficulties. These difficulties were not either pressing or significant in the earlier history of our country when both the magnitude of individual projects and the geographical extent of developments were minor. Today, however, when authorization and appropriations continually run into hundreds of millions of dollars annually, the serious difficulties in organizational procedures become more and more apparent and more and more expensive to the taxpayer.

With this highly complex situation confronting the public, easy roads to correction are not available. In spite of the advocates of various solutions there is at the moment no proposal which does not carry with it certain disadvantages as well as advantages. Enough heat has been generated in the discussion of many of the proposals to make it clear that the perfect syllogism for the control of water resources at various levels cannot be easily translated into acceptable legislation. Let us glance for a moment at some of the proposals. Space does not permit a detailed analysis of each but again it is possible to review them objectively even on this abbreviated basis. They encompass the following possibilities.

1. The independent authority, as exemplified by the Tennessee Valley Authority.
2. An authority under a single federal department.
3. An authority utilizing the services of existing agencies.
4. An independent agency on the federal level, advisory to the Congress, to the Cabinet, or to the President, to coordinate the policies, activities, investigations, plans, and programs.
5. Voluntary coordination among the federal agencies.
6. Independent action.

Each of these proposals obviously has some disadvantages. Of them all the proposal for an independent reviewing agency, anticipated many years ago by Senator Newlands, still offers the best prospect of making continued use of existing federal and state agencies, while at the same time insuring some semblance of coordination and integration. The avoidance of such an agency and its elimination when it was actually created at various times merely reflect the desire of many groups to continue without let or hindrance in the preparation of policies and programs competitive in nature, sometimes unwise in execution and only by chance fairly integrated with a logical program for the country as a whole.

If the central problem of integration were adequately solved, many of the inter-agency battles and many of the state-federal controversies could be adequately resolved. A reviewing agency, whose sole problem is to provide for a forum for state and federal voices, would do much to formulate the machinery to make these successes possible. This is not the place to review the composition of such a coordinating body, except to point out that it must include state and private representation. The necessity for federal representation is, of course, obvious. Until such an agency has been created there is little hope of having vast undertakings of completely comprehensive character adequately prepared and

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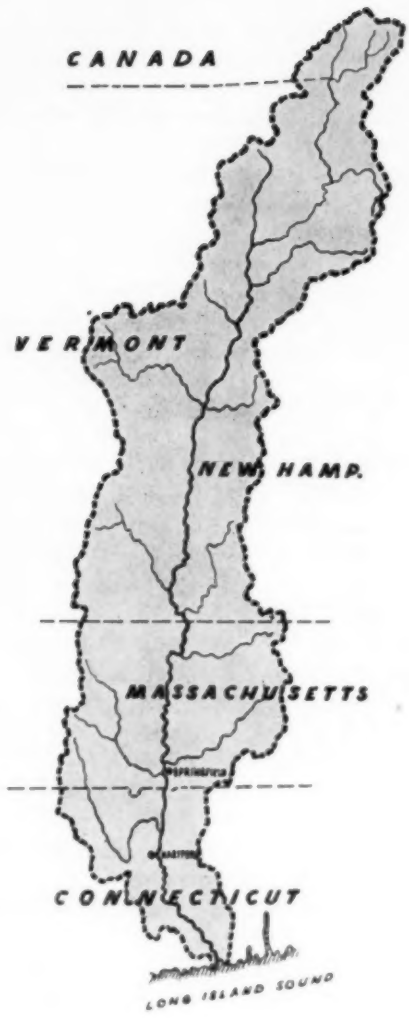
THE CONNECTICUT

By General Sanford H. Wadhams

Chairman, Connecticut Commission on Intergovernmental Cooperation



The four states in the Connecticut River Basin—New Hampshire, Vermont, Massachusetts, and Connecticut—have a history of cooperation in solving common problems which is perhaps as long as that of any valley in the United States. This cooperation started with joint defensive and offensive action against the Indians. More recently, the states have concentrated upon an effort to secure recognition by the Federal government of the rights and interests of the states in the development of their water resources. Of the interstate problems centering around the Connecticut River, flood protection is the most urgent.

Not always, however, have the four states presented a solid front. At least twice they have called on the highest Federal Court to act as arbiter in neighboring arguments. In one case, New Hampshire was successful in obtaining from the U. S. Supreme Court a decision fixing the Vermont-New Hampshire boundary as the high water line on the west bank of the river, only to have the question raised as to whether New Hampshire's success had not carried with it full obligation for maintenance and construction of bridges across the stream.

In the other case, Connecticut protested against the proposal of the Boston Metropolitan District to divert water from tributaries of the Connecticut River to augment the public water supply of the Metropolitan District—an area entirely outside of the Connecticut River watershed. Connecticut based its objection to the diversion on the well-established principle that the lower riparian owner is entitled to the undiminished flow of the stream, and further, on the adverse effect on the navigability of the river in Connecticut at periods of low stream flow. While the Supreme Court found in favor of the Metropolitan District, it recognized the rights and interest of the lower state by (1) limiting the volume of water which could be diverted at any time, (2) by forbidding any diversion from June 1 to November 30, and (3) by stipulating that whenever the river level dropped below a certain specified gauge reading, water should be released from the impounding reservoir.

The Connecticut River was so named by the Indians and means in their language "The Long River." Its headwaters are in New Hampshire at the Canadian border line. It flows south 392 miles through the picturesque New England countryside to empty into Long Island Sound at Saybrook Point, thirty miles east of New Haven. The river drains an area of 11,320 square miles and approximately 1,500,000 people live in the valley. The upper section of the basin is predominantly agricultural while the middle and lower parts of the valley are heavily industrialized. Floods are comparatively frequent and have caused in recent years heavy damages and some loss of life.

Following the disastrous flood of 1936 the Congress passed the first national flood control act. This law provided for joint federal-state action in the construction of flood control reservoirs. It encouraged compacts between states in the same river basin in order to coordinate better interstate action. It provided that the cost of constructing dams should be borne by the Federal government but that the states should furnish at their expense all lands, easements, and rights-of-way required for any reservoir project.

In accordance with this law, each of the four states in the Connecticut River Basin created a

Flood Control Commission authorized to negotiate a flood control compact with the other states. Early in the following year (1937) a compact had been agreed upon and promptly adopted by the legislatures of the four states, each of which at the same time appropriated its share of the funds required to carry out the reservoir construction program of the Army Engineers. There remained only Congressional approval of the compact, as required by the Constitution, to make it effective. The Flood Control Committee of the House of Representatives and the Commerce Committee of the Senate favorably reported bills approving the compact. The Secretary of War publicly announced his approval and stated that the Connecticut River compact might well serve as a pattern for solving the flood control problems of other river valley basins. But in spite of what appeared to be unanimous support for the bill, for some reason not made public, it was never allowed to come before the Congress for final action and it, therefore, died in Committee.

The following year (1938) the act of 1936 was amended by eliminating the states from any participation in planning and construction of flood control reservoirs. Although flood control continued to be the major problem in the valley, little progress was made in its solution during the years following the passage of the 1938 act. During this period, however, because of a concerted effort on the part of various state groups with flood control problems, aided by active support from influential members of the Congress, an amendment to the 1938 Flood Control Act was agreed upon. Out of this effort came the act of December, 1944, which recognized the rights and interests of the states in their water resources and restored to them a limited participation in the execution of flood control projects.

In 1945 the Governors of the New England states, at a meeting called to consider how the flood-protection program might be speeded up, established a New England Interstate Flood Control Committee. The chairman is Alban J. Parker, Attorney General of Vermont, who, in the tradition of New England and his native state, has been in the forefront of the campaign to restore to the states an opportunity to participate with the Federal government in the planning and execution of flood protection measures. This committee is now engaged upon the formulation of an interstate compact. It is hoped that such a compact can be placed before the state legislatures in 1947 and, in case of approval by these bodies, be submitted to the Congress. It is anticipated that by this means any divergence of views or conflict of interests can be harmonized.

In spite of the many difficulties substantial progress has been made in carrying forward the flood-protection program for the Connecticut River. A few of the twenty or more storage reservoirs called for by the Army Engineers' plan for the valley have been completed and contracts have been, or are about to be, let for others. In addition, local protection works have been practically completed for several cities in Massachusetts and Connecticut. With the improvement in method of carrying out the comprehensive program as provided by the Flood Control Act of 1944 satisfactory future progress can be anticipated.

The need for control of pollution of the Connecticut River is well recognized. Much has been accomplished in this direction but there remains much to be done. All of the states in the basin are keenly alive to this situation and steps directed towards strengthening state laws are now under way.

Consideration is being given to the incorporation in the proposed flood-control compact of measures for advancing the control of pollution, and the adoption of standards for the treatment of sewage and industrial wastes. That the efforts of the past several years for improving the condition of the Connecticut River have not been without success is indicated by the fact that the annual shad catch, which had dropped to an alarmingly low figure, has been steadily increasing. In Colonial days great numbers of salmon came into the river to spawn. It was written into the law of indenture that the freeholder could feed his bound servants with fish only a certain number of times a week. Salmon have now disappeared and the question is frequently asked as to the possibility of their return. Unfortunately, the answer is that because of deforestation and the construction of many dams, the temperature of the water during a considerable part of the year has been so raised that it is no longer suitable for this cold-water fish. While there are other factors involved, control of pollution, it seems probable, will not suffice to bring back the salmon.

A series of rapids a few miles south of the Massachusetts-Connecticut border and large dams further upstream limit commercial navigation to the lower part of the river except for small pleasure craft which can reach Springfield and Holyoke, Massachusetts. From Hartford to Long Island Sound a fifteen foot channel is maintained. Present day commercial navigation below Hartford is limited almost entirely to oil tankers and coal barges. A few years ago an oil pipeline was constructed from deep water at Providence, Rhode Island, to Springfield, Massachusetts, and extended from the latter city down the river to Hartford. The effect of this pipe line has been to reduce the quantity of petroleum products formerly reaching Hartford by barge. A project to provide a twelve-foot channel from Hartford to Holyoke, Massachusetts, has been proposed in recent years but the Congress has not been convinced that the cost can be economically justified.

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THE DELAWARE

By ELLWOOD J. TURNER

Chairman, The Interstate Commission on the Delaware River Basin.

WHILE SMALL in area—12,000 square miles—nowhere in the country is there a river system more important and valuable than that of the Delaware. It serves and is the common property of four states—New York, New Jersey, Pennsylvania, and Delaware—having a combined population of more than 28,000,000 persons, 21 per cent of the entire population of the United States. Of this number more than 5,000,000 reside within the confines of the Delaware Valley.

The Delaware River, the greatest fresh-water port in the country, and second only to New York in volume of business, is a major economic factor in the lives of the people within the basin and the nation as a whole.

In 1936, the four Delaware Basin states delegated the responsibility for devising programs for the development and conservation of the resources of this interstate watershed region to the Interstate Commission on the Delaware River Basin—"Incodel." This joint governmental agency is composed of five state officials representing the legislative, executive, and administrative branches of government in each of the four supporting states.

The story of Incodel is a story of interstate cooperation. This project, begun a decade ago, was designed as a demonstration of the willingness and the capacity of a group of state governments to work together toward a solution of problems extending beyond the boundaries of a single state. This experiment in intergovernmental relations was undertaken and has been conducted largely without the benefits of precedents, wholly without great appropriations of public funds, and without substantial grants of political power and authority. Voluntary cooperation has been its only tool. It has endeavored to supplement, not supplant, those agencies of the four state governments in this region which have been charged with the responsibility for state administration of land and water resources programs. It has tried to broaden their scope and to blend their efforts into a unified plan and program for the conservation and development of the natural resources of the Delaware River Basin.

Understanding of the problems as to water resources in the Delaware River Basin can best be obtained from an account of the work of Incodel.

Outstanding among achievements in control of water pollution in the Delaware River Basin during the past ten years has been the preparation and official adoption of an interstate agreement for the correction and control of pollution in the waters of the river. This Reciprocal Agreement, drafted and negotiated by Incodel, establishes basic standards of cleanliness or purity for the main stream and for its tributaries at their points of confluence. In addition to the pledge of administrative cooperation by each State Department of Health, the provisions of the agreement have been enacted into law in each of the four states of the basin. For the first time, these states, through their appropriate administrative departments, are acting in unison toward the common end of abating and preventing excessive pollution in the river and its tributaries.

For twenty years before Incodel, the states of New York, New Jersey, and Pennsylvania had been at odds over their right to draw upon the flows of the

Delaware River Basin for public water supplies. Two efforts toward arriving at an agreement as to how these waters could be divided and allocated among the states were made, in 1925 and 1927. Both failed. Subsequently, two years of litigation, at a cost to the states of well over a million dollars, provided only a partial answer to one phase of the problem, when, in 1932, the United States Supreme Court authorized a diversion of Delaware River waters for use in New York city under specified conditions. Future needs in the three states faced the same entangled and costly procedure. These needs were growing.

The states, through Incodel, approached this problem jointly, not independently; cooperatively, not competitively. Starting with the principle of "equitable division," established in the Delaware River Case, the states undertook a study adapting the rules established by the Supreme Court to other water supply projects, proposed or assumed. After more than three years of careful cooperative study and analysis, they arrived at an agreement as to the conditions under which any state, at any time, can take the water it needs from the Delaware River Basin for public water supply. This agreement was then incorporated into a concurrent legislative bill which is now law in each of the participating states.

The Schuylkill River and its tributaries are an important segment of the Delaware River system. For more than a century these streams have been the depository for wastes resulting from the operation of collieries in the coal fields, with the result that today more than 30,000,000 tons of coal culm line the bed and the banks of the river. Convinced that sufficient facts on the Schuylkill problem had been accumulated over the years, the Interstate Commission on the Delaware River Basin set out in 1943 to develop a coordinated plan for restoring the Schuylkill through suggesting the assignment of specific responsibilities to the Federal government, the Commonwealth of Pennsylvania, and the anthracite coal industry.

For the first time during the many years of discussion of this problem, a definite action program has been developed and accepted by the responsible agencies, both public and private, and the project is now under way.

In the Delaware River Basin, more than 50 per cent of the growth-producing cover of agricultural areas in the basin has been washed away, and a substantial proportion of land formerly used for farming is almost beyond redemption. Closely coupled with erosion is the problem of the basin's woodlands. Ruthless cutting of the forests and the destruction of the ground cover and humus layer have developed conditions unfavorable to tree growth—one of nature's most effective measures for flood control and stream flow regulation.

Governmental agencies, state and federal, have investigated these conditions and have developed corrective measures which would restore most lands to their proper use and productivity. But these efforts have not been properly coordinated. To accomplish this objective Incodel is now directing its attention to developing a unified program—federal, state, and local—dealing with problems of soil conservation and the development of forest resources. It proposes to follow its established pattern of seeking the voluntary cooperation of all interested agencies, both public and private, in the development of a practical program of action.

Incodel's plans for the development of an orderly program for control of land and water resources in the Delaware Basin involved, from the beginning, a broad concept of the inter-relationships of water pollution, water supply, soil conservation, reforestation, recreation, flood control, navigation, and other land and water uses and abuses. While major attention and effort have been given to a solution of those specific problems which were of regional importance, which were most urgently needed, and which would be immediately useful, many allied studies were carried along concurrently. A sampling of the scope and variety of this activity may be gained from the following summary.

Recreation: The potentially tremendous recreational area in the Upper Delaware Valley has been subjected to special study. A carefully drafted program of planned development (as opposed to exploitation) was prepared and has been locally sponsored.

Salinity in the Delaware: During summer periods of low-flow in the river, the salt content of the tidal section of the river below Philadelphia impairs the quality of the water and damages industrial equipment. Incodel has investigated several proposals and, in cooperation with the industries in the affected area, it has found a practical solution.

Multiple Purpose Reservoirs: An exhaustive investigation of the Army Engineers' proposal to construct a series of dams and reservoirs in the Delaware led Incodel to conclude: (1) the "highest use" of the waters of the Delaware watershed is for public water supply and this use has precedence over all others; (2) the development of the Delaware for hydroelectric power *alone* would not be economically attractive; and (3) while power developments *might* be combined advantageously, under public control, with a joint water supply project for Philadelphia and northeastern New Jersey, there appears to be no need for such a joint supply and the advisability of its development is, for the time being, questionable.

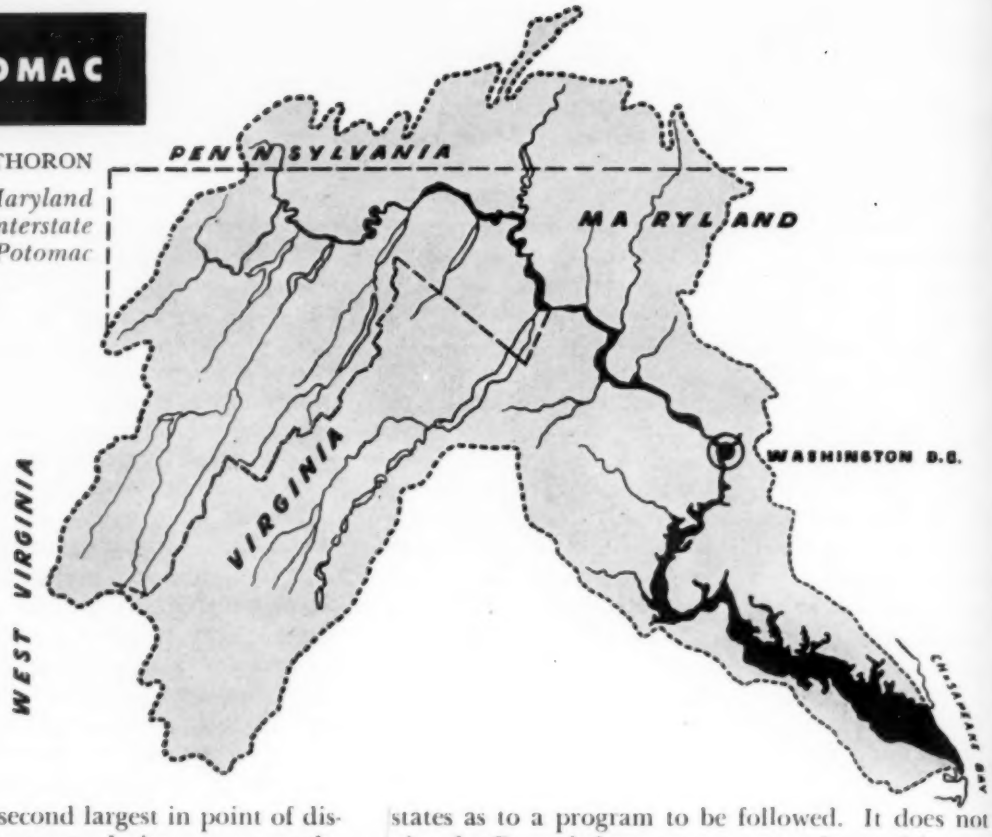
It is apparent that what happens to the land, the forests and the waters determines what happens to

(Continued on Page 238)

THE POTOMAC

By L. Harold Sothoron

Senator, State of Maryland and Chairman, Interstate Commission on the Potomac River Basin.



The Potomac River, second largest in point of discharge and fourth largest as to drainage area on the Atlantic Coast, has a watershed area of approximately 14,500 square miles. It embraces portions of the states of Maryland, Pennsylvania, Virginia, and West Virginia, and all of the District of Columbia.

The Interstate Commission on the Potomac River Basin is a commission formed under compact of the states and the District of Columbia for the control and abatement of pollution throughout the basin. The Commission consists of three representatives from each of the member states, the District of Columbia and the Federal government. The Commission, in order that it may be informed upon technical matters, has appointed an advisory Technical Committee consisting of the directors of the state planning agencies and the state health departments. It has also appointed an advisory Industrial Committee, composed of men from representative industries in the basin. The function of these committees is to advise the Commission upon technical subjects in conjunction with the control and abatement of pollution in the Potomac River Basin. In practice, many of the technical recommendations of the Commission originate with these committees.

The compact was approved by a majority of the states and the Commission had its organizational meeting in the spring of 1941. The compact authorizes the Commission to carry on investigations, research, and planning for pollution abatement, providing that it make recommendations to the states as to a program to be followed. It does not give the Commission power to carry forward its recommendations. This must be done through the existing state agencies and through publicity which the Commission is directed to carry on.

The Commission had no more than organized when World War II broke out so its activities were carried forward on a curtailed basis during the war period. It was thought that if the basic data and a plan for future abatement work could be formulated during the war, the Commission would be in a good position to carry forward corrective measures as soon as a construction program could be initiated. This policy was followed during the war and the Commission has only recently attempted to expand its activities.

The Commission, through its advisory committees and staff, has collected all available data upon the conditions in the Potomac Basin affecting pollution and has added additional data where this has been possible. A summary of much of this information has been published in a report on basin conditions.

The Technical Committee, given the job of preparing a uniform method for evaluating the quality of water in the streams of the basin, has formulated a set of criteria of purity for four principal types of water use and has zoned the basin into areas where these classifications should apply. It is believed that this will provide a uniform method for classifying streams and yet it does not fix a rigid standard which could not be made to fit all conditions.

The Commission at a recent meeting approved these standards and has recommended them to the signatory bodies for adoption within the Potomac Basin. The states and the District of Columbia have already indicated informally that these standards are satisfactory. Their adoption will provide a uniform basis for the enforcement of pollution control.

The Commission, through its advisory committees, has cooperated with the states in preparing adequate pollution legislation where existing laws were not adequate. In Virginia, meetings sponsored by the Commission were instrumental in initiating the introduction and passage of that state's new pollution law, which has recently gone into effect.

Most of the water resources problems for the basin affect or are affected by pollution and its abatement. Consequently, the Commission has studied all of the programs proposed by other agencies for the development and conservation of water resources and, so far as its funds allow, it has attempted to coordinate such programs into a workable conservation program. War conditions prevented the construction of treatment works for sanitary sewage and industrial wastes, but many communities within the basin have already prepared detailed plans for their treatment plants or additions to existing facilities which should meet the requirements recommended by this Commission.

In the vicinity of Metropolitan Washington, where over one-half of the population of the basin resides, plans have been made for additions to the existing treatment plants for Washington, D. C.; Arlington, Virginia; and the Washington Suburban Sanitary District, Maryland, while plans for new intercepting sewers and treatment plants have been prepared by the cities of Alexandria, Harrisonburg, Waynesboro, and Winchester, Virginia.

The Commission has stimulated the cooperative solution of regional problems of pollution abatement. In this connection, the District of Columbia and the Washington Suburban Sanitary District have recently come to a tentative agreement regarding the treatment of sewage from the Washington Suburban Sanitary District's Anacostia River plant at the Washington, D. C. plant at Blue Plains. Such an agreement, when finally consummated, will remove most of the partially treated sewage from the Anacostia River, thus improving the conditions in this stream to a degree which could not be obtained by more complete treatment at the existing plant.

The North Branch of the Potomac River in the vicinity of Cumberland Maryland is badly polluted with domestic sewage, industrial wastes and mine waters. This stream is badly in need of increased flow during low water periods in the summer and fall months even when these wastes are treated to the degree economically possible. Here the Commission in cooperation with the upper Potomac River Commission of Maryland and the Upper Potomac River Board has succeeded in having included an authorization for $1,900,000 in the last flood control bill for completion of the partly finished dam on the Savage River. This dam will, among other things, provide for a degree of low water flow control to the economic advantage of both the local and basin wide areas. In this case local interests and the federal agencies are on the way to solving a perplexing problem of the area.

The Commission has issued several publications setting forth the pollution conditions throughout the basin and the policy and program which it is carrying forward. In addition to these publications, it issues a *Newsletter* containing current items of interest in the pollution abatement field. The *Newsletter* is issued as often as news warrants.

The Commission considers that planning and actual construction should be left in the hands of the existing local and state agencies as much as possible. In this connection it is operating under a program in which it is attempting to act as a planning and coordinating agency on a basin-wide basis in the control and abatement of pollution. In such a program it is attempting to encourage the states to enact adequate pollution legislation, formulate and enforce uniform standards for water purity, and coordinate their programs of conservation with those of federal agencies. Such a program will, of course, require construction of treatment works by both industries and municipalities, where they are needed, and the proper and continuous operation of these and existing treatment works.

Where it is desirable and feasible to do so the Commission is encouraging the formation of local regional planning groups to plan on a local basis.

In order to carry forward its program, the Commission is continually attempting to obtain additional basic data regarding conditions in the basin, to promote local planning in regional areas, and to coordinate other water resources programs contemplated for the basin. Since the Commission has no authority and can only make recommendations to the states, it must rely upon an educational program to carry on its work. This it has done in the past and plans to continue in the future through the issuance of publications and through meetings with interested persons.

Members of the Commission believe that while it may not be able to accomplish its purposes as fast as might be done under some of the other methods of basin-wide planning, it will be successful in its program for the control and abatement of pollution throughout the Potomac River Basin, and will provide the states, local municipalities, and individuals the freedom of initiative which they have enjoyed in the past.

THE SAVANNAH

By G. T. Papageorge

Director, Public Works Panel, Agricultural and Industrial Development Board of Georgia.

The Savannah River is formed by the junction of the Tugaloo and Seneca rivers in the Piedmont uplands. Its drainage area is 10,579 square miles, of which 359 are in North Carolina, 4,282 in South Carolina and 5,938 in Georgia. The river has its headwaters in the Blue Ridge Mountains of North Carolina and flows 314 miles along the boundary of Georgia and South Carolina, emptying into the Atlantic Ocean 17 miles east of the city of Savannah. The upper 2,000 square miles of the river's basin lie in mountainous country, but from Augusta, on the "fall line," to the sea the river flows through the Coastal Plain, where the land is gently rolling, or flat and swampy. The two largest towns on the river are Savannah and Augusta, with populations in 1940 of 95,996 and 65,919, respectively. The central upland section above Augusta is an agricultural and manufacturing region, while below the fall line good farm lands and timber are found. The basin, as a whole, produces water power, agricultural products, textiles, paper, fertilizers, timber products, and naval stores.

The river has been improved up to Savannah to provide an adequate harbor for ocean-going commerce. Additional improvements have been authorized at an estimated cost of about $3,000,000, of which $1,000,000 has been appropriated. The channel depth in the harbor is to be increased from 30 to 34 feet.

For some time the upper reaches of the Savannah River system have had extensive electric-power developments, built by private interests. The region is ideally suited for such developments, because of the very great fall of the river and the heavy rainfall in the mountains. One of the Savannah's tributaries, the Tallula River, is the most completely developed stream in Georgia. Four reservoirs, located within a distance of about 25 miles, have a total rating of nearly 100,000 kilowatts and operate under a combined head of 1,000 feet. The dam at Tallula Falls has a head of 608 feet, the fourth highest head of any plant east of the Rocky Mountains. There are other extensive power developments both on the main stem and on the other tributaries of the Savannah. The plan for the ultimate development of the river, approved by Congress, includes the construction of 11 more dams and reservoirs, all located above Augusta. These will develop 730,000 station-kilowatts of electric power and will regulate the flow of the river at Augusta to about 7,000 second-feet.

One of the largest and most important of these developments is at Clark Hill, some 22 miles above Augusta. This project has been authorized, plans are in preparation, and $4,500,000 has been appropriated by Congress for construction, which was to begin as soon as the plans were ready, either late in 1946 or early in 1947. The total cost of this multiple-purpose project is estimated at $45,000,000. Bids were opened on July 9 for an access railroad on the South Carolina side and it is expected that the states of Georgia and South Carolina will start construction on access highways in the near future. In view of the recent executive order suspending all non-essential federal construction which has not been started, the date for beginning work on the dam cannot be foretold at this time.

The Clark Hill Dam will be built on a foundation of solid granite. Its maximum height will be close to 200 feet and its length a little over a mile. The area of the reservoir at full power-pool level will be 78,000 acres and its length along the Savannah River 36 miles. The regulated storage capacity for power production will be 1,500,000 acre-feet. This will provide a dependable flow of 6,500 cubic feet per second. The power-house will have an ultimate installation of seven units of 40,000 kilowatts each, or a total of 280,000 kilowatts.

Important economic benefits are expected to be derived from the Clark Hill project. The ratio of annual benefits to annual cost has been estimated

at 1:1.3. Intangible benefits could increase this ratio to as much as 1:2. The greater amount of available electric energy is expected to prove a stimulant to the industrial growth of the region. The city of Augusta especially should profit from this as well as from the development of recreational and other facilities in the area.

At present, the channel of the river from Augusta to Savannah is 6 feet deep but this depth is dependable for only 75 per cent of the time. The Clark Hill reservoir will provide a dependable flow which will insure a minimum navigation depth of 7.3 feet all of the time. It is understood that local interests plan to conduct a survey to determine whether or not a 12-foot depth below Augusta is justified. Navigation on the Savannah River up to Augusta with the city of Savannah as the outlet port is expected to produce numerous benefits through stimulation of local and foreign commerce.

Augusta is now protected against floods up to a stage of 50.4 feet by levees about eleven miles long. The flood surcharge in the Clark Hill reservoir will reduce appreciably the likelihood of flood damage in the plain below Augusta. The damage from summer floods occurring when the reservoir is near the minimum level will be greatly reduced.

The city of Savannah will also benefit from the construction of the Clark Hill Dam. At the present time, Savannah obtains its water from artesian wells. In recent years industrial plants have increased the consumption of water to a point where intrusion of salt water threatens. The city, therefore, plans to develop a water supply from the Savannah River. Salt water, however, has been advancing farther and farther upstream due to the deepening of the river channel. The increased minimum flow of the river from the Clark Hill reservoir will go a long way toward counteracting this salt-water encroachment.

Other rivers in Georgia are also being developed or plans are being made for development. Four dams on the Apalachicola system have been authorized by Congress. One of these is at the junction of the Chattahoochee and Flint rivers; two others will complete the canalization of the Chattahoochee up to Columbus, Georgia; and the fourth, located above Atlanta on the same river, will provide in the Atlanta area a water supply for industrial expansion, electric power, and recreational facilities. A $17,000,000 dam is under construction at Allatoona, Georgia, on the Etowah River, a branch of the Coosa. A study of the Altamaha River and its two main tributaries, the Ocmulgee and Oconee, is now under way by the U. S. Army Corps of Engineers and a similar study is also being made of the Apalachicola system.

Many agencies have been working to bring about the development of Georgia's rivers. Several local associations have been formed and these are working with the Agricultural and Industrial Development Board, which is the state agency designated by Governor Arnall to represent Georgia in its relations with the U. S. Army Corps of Engineers in their investigations on river development.

Local, state and federal agencies are all placing a great deal of emphasis on the full development of navigation, power, flood control and recreational benefits. Recreational benefits in particular are being stressed. The 1944 Flood Control Act and subsequent amending acts authorize the Chief of Engineers to develop and operate recreational facilities in connection with reservoir projects under the control of the Secretary of War. This legislation also permits the War Department to allow states and other public bodies to construct and operate such facilities.

This is another important step in allowing government agencies to develop the waterways of the nation in such a manner as to assure maximum public benefit from the development. Congress has recognized that the construction of large artificial bodies of water, in most cases far removed from natural lakes, affords an outstanding opportunity for recreational development. The public has long appreciated the recreational resources available at reservoir projects and has taken advantage of such opportunities even when little or no thought was given to scenic and recreational resources at the time the project was developed. Under the new legislation the Corps of Engineers is now directed to recognize this need and to take such steps as are desirable for meeting the reasonable public demand for the provision of recreational facilities.

The plan for the overall development of the Clark Hill reservoir, for example, included a preliminary report on the recreational needs and resources of the reservoir area. This report indicated that there was a heavy public demand for outdoor recreation which could be served by providing facilities in connection with the reservoir project.

This plan has been tentatively approved by the Chief of Engineers and the preparation of a master recreational plan for the entire reservoir is now in preparation. The States of Georgia and South Carolina as well as local communities in the area are being given an opportunity to participate in this planning to the fullest possible extent and are expected to participate in the construction and operation of the resulting facilities.

If present plans materialize, the Clark Hill reservoir will offer recreational opportunities to a large segment of the population of Georgia and South Carolina who would otherwise be denied the opportunity of participating in outdoor recreational activities found only in connection with large bodies of water.

THE LOWER MISSISSIPPI

By Caye A. Nelson

Director, Louisiana Economic Development Committee.

Historians are not agreed precisely as to who was the first white man to see the Mississippi River. Although the honor is popularly accorded De Soto, there is evidence that the river was known to earlier explorers, even including Columbus, whose fourth voyage, may have taken him into the Gulf of Mexico and to the Mississippi's mouth.

From the time of the first explorations, however, there seems to have been no question as to the river's tremendous economic value, not only because of the countless fertile acres that lay along its banks, but also because it was obviously a natural artery of commerce and transportation.

The great stream, rising in a tiny lake in Minnesota, traverses a sinuous course of nearly 2,500 miles before it reaches the tip of the Louisiana delta, where it branches into the several passes that constitute its mouth. Together with its tributaries, the Mississippi drains more than 1,245,000 square miles. At its most easterly point the divide of this great watershed is within 250 miles of the Atlantic Ocean, while its western limits extend to within 500 miles of the Pacific. In whole or in part, thirty-one states of the Union and two Canadian provinces are covered by its drainage basin, which is exceeded in size only by those of the Amazon and the Congo.

Recognized from the first as a tremendous natural asset, the Mississippi was no less quickly seen as a periodic liability. Although it builds up millions of acres of rich alluvial soil to support the agriculture of its settlers, the river was ruthless from time to time in bursting from its banks, sending billions of tons of flood waters across its valleys, and working wholesale destruction of both property and life.

The first recorded flood of the Mississippi (1543) was described by de la Vega in his history of De Soto's expedition. He describes this flood as severe and prolonged. Since the flood described by de la Vega, there have been some sixty additional recorded floods of the Mississippi, an average of one every six and one-half years.

The necessity of flood control is well illustrated by the state of Louisiana, the final area through which the river flows before passing into the Gulf of Mexico. The main flood control problem of the state consists, as it has for centuries, of harnessing the Mississippi itself, but several other interstate streams which are tributaries of the Mississippi require large expenditures and continuous work. These include, in order of their importance, the Red, Ouachita, and Boeuf rivers, and Bayou Macon. Many streams lying entirely within the state have also caused considerable damage in the past, and also require continuous control.

Louisiana's agriculture, forestry, and scores of its industries depend for their very existence upon protection from periodic overflows, as do many of its large population centers. Even today, with the most advanced machinery and methods of levee construction available, the maintenance of flood protection in Louisiana is a task requiring constant vigilance and work on the part of many cooperating agencies.

In 1717, Bienville, who fifteen years earlier had established a colony on Mobile Bay, found his settlement a failure, determined to move to a more favorable site, and chose the present site of New Orleans. De la Tour, his engineer, strenuously opposed the selection, arguing that the town would be frequently overflowed by the river. But Bienville over-ruled him, and New Orleans was founded in 1717, four years later becoming the capital of the Louisiana Territory.

Bienville heeded de la Tour's warnings regarding floods, however, and authorized him to build a dike to protect the town. In ten years he had completed a levee three feet high, more than a mile in length, and with a top width of eighteen feet. This levee was rapidly extended for miles both above and below New Orleans, its growth keeping pace with the establishment of additional settlements and agricultural development. By the end of 1735, the levees extended along both banks of the river for a distance of thirty miles above New Orleans, and twelve miles below. It is interesting to note, as an indication of the people's growing awareness of the flood menace, that in 1743 an ordinance was passed requiring inhabitants to complete their levees within a stated time, under penalty of forfeiture of their lands.

By 1745, despite great difficulties caused by the treacherous river and periodic hostile outbreaks of the Indians, navigation on the lower Mississippi had reached important proportions. The river was playing an important part in the development of trade with the vast central portion of the United States, with New Orleans receiving huge cargoes of produce from the Illinois country. Great additional impetus was given by the introduction of the steamboat between 1811 and 1817. By 1820 the growing population of the lower river valley, especially in its southern areas, and the now firmly established steamship greatly emphasized the need of both flood control and navigation improvement, and national attention began to be focused upon the Mississippi.

Congress gave first consideration to navigation, rather than to problems of flood control. Improvements were actually authorized for the first time in 1824, when $75,000 was appropriated to remove snags in the Mississippi and Ohio rivers. Destructive floods of 1849 and 1850 created widespread damage, and in 1850 Congress appropriated $50,000 for a topographic and hydrographic survey of the delta, and other appropriations of $75,000 and $330,000 followed shortly for navigation improvements.

The Civil War, beginning in 1861, caused a discontinuance of these operations, and levees were allowed to fall into disrepair. Heavy floods in 1862 and 1865 increased the damage to the levee system. Another flood in 1874 was so destructive that Congress organized a board of engineers known as the Levee Commission and directed them to make a thorough examination of the levee system and submit a plan for reclamation of the alluvial valley. Their report as expected, found conditions along the levees deplorable and stated that little progress in flood control could be accomplished without federal aid.

The year 1875 ushered in one of the greatest single achievements in river history. By the Rivers and Harbors Act Congress authorized James B. Eads to build jetties where the Mississippi empties into the Gulf through the South Pass, for the purpose of "obtaining and maintaining" a ship channel. The magnificent success of Ead's project solved the problem of channel maintenance at the river's mouth, and provided the necessary depth so that seagoing ships could enter the port of New Orleans.

In 1879 a bill was introduced into Congress providing for the creation of a Mississippi River Commission, and a year later Congress placed the stamp of approval on the Commission's recommendations by appropriating $1,000,000 for its operations. It also provided for the extension of the Commission's operations to the tributaries of the river. By 1906 the plans and operations of the Commission were well advanced.

The year 1927 marked the greatest flood on record in the lower valley. Complete and seasoned levee works constructed to the standards of the River Commission proved to be of insufficient height and failed. Flood levels attained unprecedented heights and losses exceeded those ever before experienced. The nation was finally convinced that in the work of flood control and prevention local interests would have to receive far more aid from the Federal government than it had previously given.

Plans submitted to Congress provided for the repair, strengthening, and extension of the existing levee system, and for the construction of floodways to accommodate waters in excess of the capacity of the leveed channels of the main river. The Flood Control Act, subsequently passed, outlined plans for the control of a much greater flood than previously had been considered possible, and also made definite changes in the organization and direction of the Mississippi River Commission. To promote better coordination in field operations, district headquarters were set up at Memphis, Vicksburg, and New Orleans. This strengthened organization, and subsequent large federal appropriations for additional works enabled the Commission and cooperating state and local flood control agencies to cope with later floods more successfully.

The Mississippi River Commission continues its work, having at present the most comprehensive flood control and navigation improvement program in world history. Present operations include the hydraulic laboratory, known as the Waterways Experiment Station, at Vicksburg, where experiments and studies in flood control are carried on with the use of models.

Louisiana has gradually achieved, through the combined efforts of federal, state, and local agencies, comprehensive levee systems on its main streams. The state department of public works carries on plans and programs for new projects in flood control

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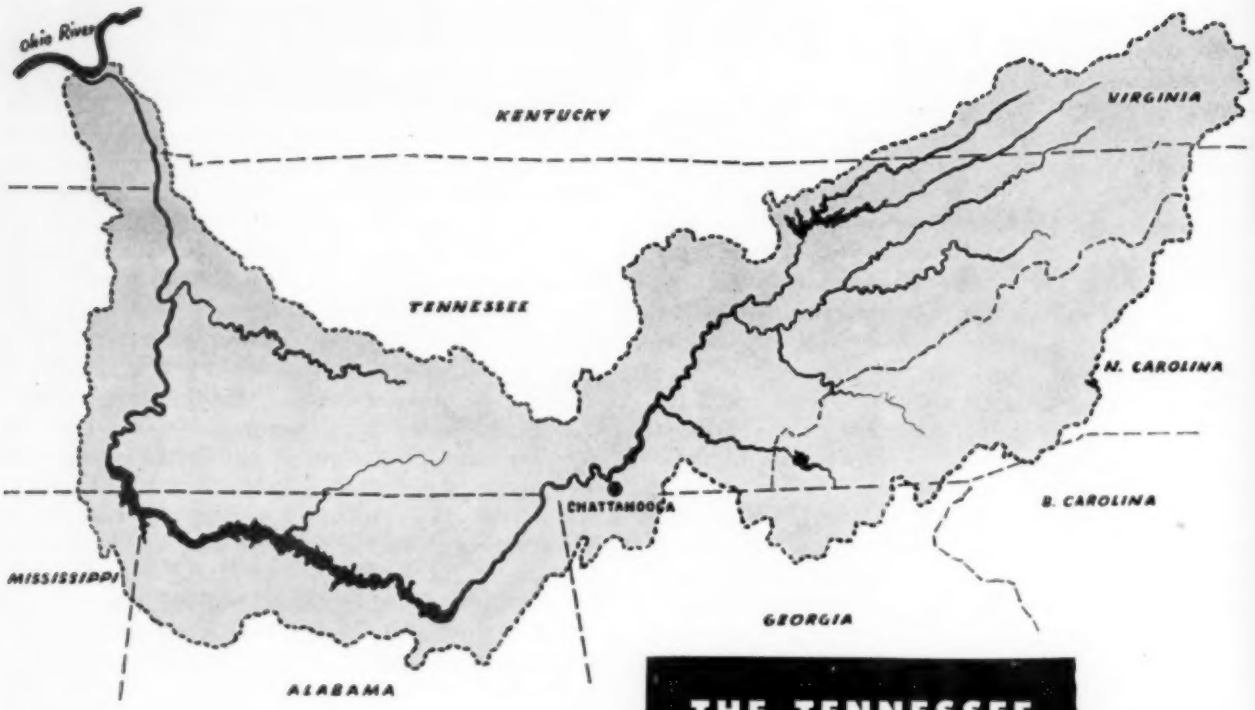


THE TENNESSEE

By Paul S. Mathes

Tennessee Commissioner of Conservation.

The development of the Tennessee River Valley is unique in history, and the benefits already manifest since the project was started in 1933 are astounding. The elaborate program is being carried out by the Tennessee Valley Authority in cooperation with about a hundred other federal, state, county, and municipal governmental agencies, and groups of citizens.

The outstanding success of the program is believed to be due to two facts:

1. TVA is not operated by remote control from Washington; instead, it works in the Tennessee Valley. All its offices and personnel are in the area, always available to and working with the people in the region. There is no office in Washington and no necessity for interested citizens to pull wires or send delegations to the national capital to get things done. This fact accounts for the speed and efficiency with which the Tennessee River Valley has been developed.

2. A large share of the project's success is also due to the close cooperative working agreements that TVA has with the state, counties, cities, and groups of citizens. Other agencies with which it works include state universities, land-grant colleges, agricultural experiment stations, engineering experiment stations, state extension services, library boards, school boards, and teacher training institutions, as well as the National Forest Service, National Park Service, U. S. Fish and Wildlife Service, Soil Conservation Districts and numerous other governmental agencies and private groups.

Out of the relationships with these agencies comes the factual and scientific basis for programs of better land use. Through these agencies, in cooperation with TVA, the facts developed by research, by investigation and by practical experimentation are channeled into the everyday knowledge of more citizens—farmers, workers, employers, businessmen, housewives, and others whom these agencies were established to serve.

I can endorse these methods of procedure because of my own gratifying experience with TVA. The State Division of Forestry, the Division of State Parks, the Division of Game and Fish, and the Division of Geology, all of which are administered by the Department of Conservation, of which I am Commissioner, have very happy working agreements with TVA and under these agreements these state divisions have made unprecedented progress in recent years.

TVA was set up thirteen years ago when it was authorized by Congress to conserve and develop all the resources of the valley. Already its impact on all the people of the region has been highly beneficial. If anyone had predicted thirteen years ago that thousands of motor boats would be chugging among the Tennessee hills, that men would be fish-

ing in burned-out woods and that high tension wires would be streaking over cabins then lit by candles, he would have been locked in the asylum.

Then came the Tennessee Valley Authority with its gigantic program of navigation, flood control, soil conservation, reforestation, and an abundance of inexpensive electric power. That program called for a series of huge dams that backed up the water of the Tennessee River into thousands of wasted inlets and coves among the picturesque hills. Now the Tennessee River, which formerly wasted its energy on frequent rampages causing millions of dollars' worth of property damage, is completely harnessed. In fact it is no longer a river but a chain of lakes 650 miles long, with a water surface of more than 700,000 acres—almost 1,100 square miles.

These lakes are lined on both sides by scenic beauty varying from wide cotton fields to high, forested mountains. Although recreation was not mentioned in the Congressional Act that created TVA, these delightful waters and beautiful scenery have made recreation a by-product of the program. Recreation has rapidly grown into the state's third largest industry and attracts hundreds of millions of tourist dollars to Tennessee. Beautiful parks containing rustic cabins and scores of fishing camps and docks are now being operated on the shoreline. Six thousand motor boats are plying the waters, and it is predicted that this number will be greatly multiplied as boats become available. It is expected that these southern lakes will become the most popular boating waters in the country because of the mild climate and other recreational advantages.

In addition to the nine river lakes, all of which are connected by locks that permit stairway navigation from the Ohio River to the base of the Great Smoky Mountains, fifteen reservoir lakes have been built on tributaries far back in the mountains.

Huge power houses at the dams are now developing more than 12,000,000,000 kilowatt hours of power and will be prepared to produce 21,000,000,000 kilowatt hours when the entire TVA project has been completed.

Power rates have dropped substantially in factories and homes since the advent of TVA, and the use of electricity has spread to tens of thousands of farms that formerly depended on human muscles by day and kerosene and candles by night.

It is in the rural areas that the spectacular improvement has become one of the fascinating chapters in America's history. Women no longer carry water from the spring; they have electric pumps. They no longer do the family washing in black pots beside the creek; they have washing machines on the back porch. Electric ranges replace old kitchen stoves that have been turned in for scrap iron. Eggs and butter are kept fresh in refrigerators instead of in baskets hanging in the well. A motor hums in the barn where men take advantage of many of the 200 ways they can use electricity on the farm. Power from the river has taken the labor from the backs of most of the rural folk. But the marvel of marvels for rural men is an electric bulb in the cowshed, and the acme of luxuries for women of the hill country is an electric curling iron. These are morale builders, symbols of transformation and reanimation.

The lakes also provide a nine-foot channel, for large steamboats and barges, extending across the states of Kentucky, Tennessee, and Alabama all the way from the Ohio River to Knoxville, Tennessee. This reduces freight rates, increases commerce, and releases railroad cars for other work. Cargo boats now glide from points on the Tennessee River to Pittsburgh, Minneapolis, Omaha, St. Louis, New Orleans, and Gulf ports.

In order to keep the lakes from filling with silt, TVA is carrying on a huge program of reforestation and soil conservation. To do this it has been necessary to teach better farming practices throughout the 40,000,000-acre area. More than 200,000,000 trees have been planted, millions of gullies have been dammed, and thousands of eroded fields have been converted into terraced, productive acres. More and more land is being put to its proper use every year. Crops are being diversified, woodlots are being developed and utilized, and more cattle and sheep are appearing on the hillsides.

Naturally, the development of the mineral, forest, and agricultural resources of the area, together with navigation and inexpensive water power, is rapidly attracting numerous large and small industries to the valley. It is because of this great development that *Collier's* magazine of July 13, 1946, said: "Tennessee's war-born industries are being reconverted to peace production faster and more successfully than any other southern state's."

All of this has raised the social status and standard of living of the people by adding to the income of practically everybody in the valley. What a contrast to a few years ago when many persons in the area felt a sense of frustration under back-breaking labor amid the waste of burned woods, depleted farms, undeveloped minerals, and the spilled energy of the river.

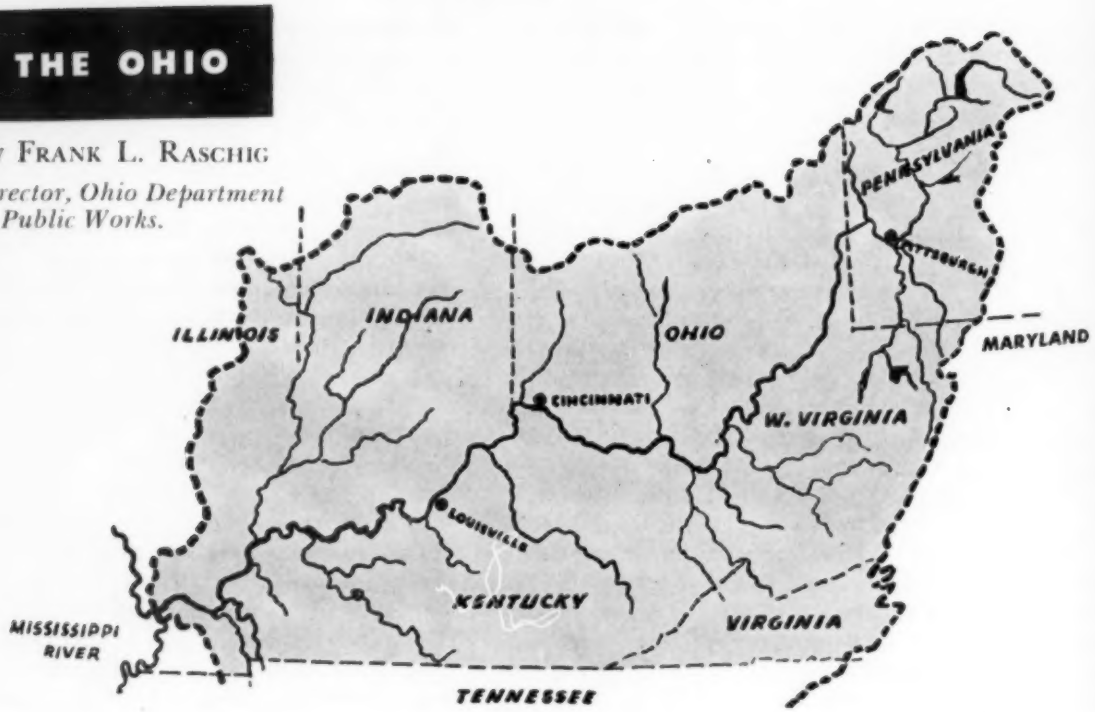
The change has been magical, in the development of both material resources and mental concepts. Electricity and conservation have psychological effects that release human energy. Transformers also step up the spirits of men. One single fact plus human ingenuity stands back of all this. As one TVA official explained: "The only thing behind this whole program is 60 inches of rainfall. We are using that gift for the benefit of mankind."

At any rate, it is inspiring to see how the resources of a controlled river can improve the social and economic status of the people.

THE OHIO

By Frank L. Raschig

Director, Ohio Department of Public Works.



The Ohio River Basin has a drainage area of 203,900 square miles and its population comprises more than 14 per cent of that of the United States. It is the second largest tributary in the Mississippi River system from the standpoint of size and the first from the standpoint of volume of flow. High population density as well as a high degree of industrialization in parts of the area have resulted in many water problems. The main problems are those of municipal and industrial waste disposal, flood abatement and low flow control, industrial and municipal water supply, soil erosion and deforestation, navigation, recreation, and the production of hydroelectric power.

The pollution problem in the Ohio River is accentuated by the extreme variations in flow. For example, the low flow at the mouth has declined to as little as 20,000 second-feet (13,000,000,000 gallons per day) or about 8 per cent of the average flow. Tributary streams in general display similar characteristics. The U. S. Public Health Service has determined from surveys that the river receives 940,000,000 gallons per day of sewage, about two-thirds of which is untreated. To the sewage load must be added that of industrial waste, including enough waste from chemical industry to be equivalent to a sewage load from nearly 10,000,000 population. Acid mine drainage contributes an acid load of 1,800,000 tons per year. The high degree of pollution seriously damages and jeopardizes water supplies, navigation and hydroelectric structures, aquatic life, and recreational facilities.

Flood abatement is a serious problem in the basin. The flood of January, 1937 was the most disastrous on record. It indicated the vulnerability of the area to floods and the need for control. This flood drove more than 500,000 people from their homes and caused damage estimated at more than $400,000,000. The Ohio River Basin is on the path of winter storms that transport large quantities of moist tropical air from the Gulf of Mexico. Contact with cold fronts over the Ohio Basin causes intense and prolonged precipitation when vegetation is dormant and the infiltration capacity of the soil is least. Also, the southern tributaries are in general in rough topography, which causes rapid runoff and sudden concentration of flood waters. Occupancy of flood plains has greatly increased the damage resulting from floods.

Industrial and municipal water supplies are damaged in many areas by the extreme pollution of the Ohio River and its tributaries. According to the U. S. Public Health Service, of the 634 public surface water supplies, 294, serving nearly 6,000,000 people, are subject to pollution by human sewage. The large volume of acid mine waste and industrial pollution has in some areas seriously damaged the industrial utility of the water.

Soil erosion in the basin has caused untold destruction to land resources, has caused heavy siltation of reservoirs, and has resulted in increased cost of maintenance of navigation channels. Parts of the basin are subject to severe gully erosion because of the deforestation of steep hillside slopes.

The importance of navigation on the Ohio River and its tributaries is apparent from the fact that more commerce is transported on it than on any other river system in the United States. Problems in navigation relate to improvement and extension of the system and to the allocation of the cost of maintenance, operation, and improvement.

The problems of recreation are directly related to those of pollution. Recreational values have been destroyed in many areas, as has aquatic wild life.

The Ohio River Basin contains potentialities for further hydroelectric power development, especially as standby peak load power. Such developments, however, must compete with the fact that the area contains the richest coal fields in the United States, with consequent opposition from those engaged in the production of coal.

All of the problems of the Ohio River Basin are those associated with a maturing economy. That the region is reaching a maturing period is indicated by the lower population gain in recent decades as compared with other areas more recently developed.

A great advance in measures for pollution control was the comprehensive survey completed by the U. S. Public Health Service and published as House Document No. 266. The interest of the states in pollution control was manifest in the formation of the Ohio River Sanitation Compact. This compact awaits only the participation of Virginia to become effective. The state compact principle appears to be a more desirable and democratic method of dealing with the pollution problems of the basin than Washington control or a valley authority usurping the powers of the states.

The cost of a comprehensive program of sewage treatment is a deterrent to the program. Prior to 1900 there were only two sewage disposal plants in the entire basin, those being in the state of Ohio. During the period 1935-40 more sewage disposal plants were built than during the previous 35 years. Significantly this period coincided with the period of federal aid through grants-in-aid and W.P.A. Whether such a stimulus through federal funds can be provided again is doubtful. The states might, however, consider granting of aid to municipalities for construction of disposal works.

Treatment of industrial waste must be provided, to abate pollution. It appears that much could be accomplished by adopting federal methods of taxation, in order to furnish incentives and inducements to industry for treatment of wastes—for example, the cost of waste treatment plants could be chargeable to operations cost rather than to a capital account.

Flood abatement is being carried out by the Corps of Engineers through construction of reservoirs on tributaries, channel improvement, levees and flood walls. Under the 1944 Flood Control Act the states are given much wider opportunity to collaborate in location, design and operation of reservoirs. This was a much-needed amendment to the Flood Control Act and should result in much more consideration of local interests and values. Often flood control reservoirs can serve many purposes other than flood control such as low-flow stream regulation, hydroelectric power production, industrial and municipal water supply, and recreation. It is necessary, therefore, for each state to have an agency or a competent person who can critically analyze proposed flood control projects to assure that all local benefits have been considered.

The state of Ohio pioneered in reservoir flood control through the Miami Conservancy District. Five reservoirs and extensive channel improvement were carried out with highly beneficial results. The formation of the Muskingum Watershed Conservancy District followed. The works consist of fourteen reservoirs and extensive levee work, the project being financed largely by Federal Emergency Relief funds. The reservoir concept is now firmly established and many reservoirs have been built in the Ohio River Basin by the Corps of Engineers. Many more are contemplated in the comprehensive plan for the basin.

The conservation of our soils has received a new impetus through the formation of soil conservation districts. This plan appears to be an enlightened and democratic approach to the problem in that the districts are democratically organized and governed, receiving technical advice and assistance from state committees and the U. S. Soil Conservation Service. Reforestation of submarginal lands has made much progress through state and federal forest purchases. Encouragement of farm woodlots on steep hillsides, and education to prevent overgrazing on such plots appears to be more effective.

I do not propose to discuss here the economics of water transportation or whether waterways should be operated toll free at federal expense. It does appear, however, that in many instances over-all or regional effects have been overlooked. For example, the Illinois waterway appears to subsidize the Chicago-Gary steel area, which is in competition with the Pittsburgh-Youngstown-Cleveland area. The latter area now is asking for the Lake Erie-Ohio River waterway to meet this competition. Possibly a review of the economics of each project by some agency such as the Interstate Commerce Commission would be advisable.

Recreational areas are being developed at many of the flood control reservoirs where conservation pools are being maintained. There is a large field of study to develop maximum recreational values, which in general have been overlooked. Prior to the 1944 Flood Control Act no recreational benefits

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THE MISSOURI

By M. Q. Sharpe
Governor of South Dakota

Prepare for vast distances, large figures, and broad concepts when you consider the Missouri River. It is the largest river in the United States; from its headwaters to junction with the Mississippi near St. Louis—3,000 miles; its basin occupies nearly 530,000 square miles, of which 9,000 miles are in Canada; it covers nearly one-sixth of continental United States, and comprises parts of ten different states: Colorado, Wyoming, Montana, North Dakota, South Dakota, Nebraska, Iowa, Minnesota, Kansas, and Missouri; its altitudes vary from a high of 13,000 feet to a low of 400 feet. The states comprising its basin have a population of more than 15,000,000 people. In its basin are found some of the nation's largest supplies of coal, oil, gas, lumber, gold, silver, iron, manganese, copper, lead, zinc, in fact practically all of the world's useful and precious metals; also wool, beef, hides, grains. It is the leading mining, livestock, and cereal producing section of America. It occupies the mid-section of the nation and has a salubrious and energizing temperate zone climate.

Glaciers, mountain lakes and springs, deep blankets of snow over its immense plains, and torrential rains all contribute water to its powerful stream. These coupled with the great varieties in altitude and long stretches of narrow river valley cause the region to be detrimentally affected by floods. The record of these extends back more than one hundred years. Much damage has been done and many lives lost through them. The great flood of 1881, wrecked twenty steam boats at the Port of Yankton, South Dakota and the force of the flood cast one of them nearly one half mile inland; the flood of 1906 put seven feet of water through the Union Station at Kansas City, Missouri; the flood of 1943 did a calculated damage of more than $40,000,000 along the Missouri and covered the fine Omaha municipal airport with seven feet of water. With all of this the river is constantly carrying to the sea great quantities of the rich soil of the bottoms, benches, and banks, through soil erosion.

The Missouri is an interstate stream. Under the law the United States has complete regulatory control of it for purposes of interstate commerce and has a statutory obligation to provide effective flood control measures for the entire valley. Those are the legal reasons why the Federal government has enacted into law the great Missouri River Development program sometimes known as the Army Engineer Corps—Bureau of Reclamation Plan from the two agencies of the government who contributed most to designing it; sometimes called the Pick-Sloan plan from Brigadier General Lewis A. Pick, U.S. Army (builder of the famed Leddo Road during the war), and Glen W. Sloan, lifelong resident of the valley and expert practicable irrigation engineer with the United States Bureau of Reclamation.

Like the river itself the plan is vast in its proportions: 107 reservoirs or dams of which five new ones, making six with Ft. Peck, now in operation are across the main stream and the balance are on the tributaries; a continuous line of levees on both sides of the river all the way from Sioux City, Iowa, to St. Louis, Missouri. Cost: approximately $1,500,000,000 when all completed. Time to build: about twenty-five years in all. Benefits: complete flood

control and soil conservation; newly irrigated land, 4,760,400 acres; power plants, 22, with installed capacity of 1,494,267 kilowatts with an output well above 5,500,000,000 kilowatt hours annually; navigation; connection of the upper reaches of the river at least as far north as Bismarck, North Dakota, with a standard navigation channel of nine-foot depth and affording transportation to and from Pittsburgh, Birmingham, New Orleans, Chicago, the Twin Cities, all lake ports and the St. Lawrence seaway. It is a project of empire building proportions which will bring this great inland midsection of the United States into increased and improved production of food products, raw materials of various kinds and processed and fabricated products, all for the enrichment of and raising of the standards of living and security of the world at large. The project has been found and declared practicable and feasible from an engineering, financial, economic, and sociologic standpoint.

Attractive and influential as the reasons for it always have been, the Missouri is practically the last great river system of the country to receive federal development appropriate to urgent requirements. This was because there had been no concerted efforts by the states comprising its basin. For fifty years isolated groups, towns, cities, and even a state or two have variously and independently urged different development projects at different times. Numerous river associations have been in existence, all operating along the independent lines of their local interests. The concerted effort for basin-wide development really got started however on December 16, 1941, at Bismarck, North Dakota, where Mr. P. H. Ellwood of Ames, Iowa, and Mr. Clifford H. Stone of Denver, Colorado, Chairmen of Regions VI and VII of the National Resources Planning Board, were conducting a basin-wide planning conference. About two hundred delegates were present from all parts of the valley, St. Louis to the headwaters. Most of these delegates themselves were the leaders or accredited representatives of large groups or associations and public and private agencies. Many federal agencies and many states and state agencies and officials were represented.

At this meeting was formed the idea of a Missouri River States Committee to be of semi-official status and appointed by the Governors of the Missouri River states. The plan was carried back to the Governors of the states and eight of the ten agreed to the idea and appointed members; the other two states soon joined. The Committee that resulted was called the Missouri River States Committee, and consisted of the ten Governors plus two members from each state, whom they appointed. The Committee organized by electing officers and started the work of geting adopted one comprehensive basin-wide plan of development for the entire river system. It held meetings in different parts of the basin. It unified the efforts of all the different states, cities, towns, communities, river associations, and influences of any kind interested in river development. It sent its sub-committees to appear before committees of the Congress. Its main central idea was an over-all plan of Missouri River development to obtain the multiple benefits of flood control, power development, irrigation, navigation, wildlife, and recreation, soil conservation and related benefits, without any preference for any and without any favoritism toward different localities up and down the river. It kept actively, aggressively, and intelligently at work. It secured the support of congressional delegations of its own states and of other states having river development programs in mind.

The Governors of the Missouri valley states took personal active parts in the work and attended personally most of the committee meetings. It was a good example of interstate cooperation in the true and practicable use of that term. It played an important part in ironing out controversies between different interests and different localities and getting various federal agencies into agreement and then getting the Congress to adopt the plan above outlined. The Committee is still active and ready for any and all tasks that will aid in carrying out the plan to final successful construction and operation.

This Missouri River States Committee was active in getting established another semi-official committee known as the Missouri River Inter-Agency Basin Committee, consisting of representatives of the United States agencies most directly connected with the development, to wit: The Army Engineer Corps, Bureau of Reclamation, Department of Agriculture, and Federal Power Commission, and, as a part of it, Governors of the four of the Missouri River states selected by the Missouri River States Committee. This Committee meets regularly each month in a different state in the valley and through inter-agency clearance of information and work, together with counsel and cooperation of the states through its four Governor members, tends to afford the centralization of authority, coodination of effort, and general supervision essential to such an extensive project. General Lewis A. Pick, the Army Engineer Corps Member of the Inter-Agency Basin Committee, is the present Chairman of it.

The project is of such vast dimensions and of such national importance that the Congress must at all times retain and exercise final decision on any and all of its important features or controversial subjects. The Missouri River States Committee and the Inter-Agency Basin Committee can be of much aid to the Congress and to the Missouri River basin and the nation at large by continuing their efforts along the lines and with the general plans and policies they have heretofore developed.

THE COLORADO

By Clifford H. Stone

Director, Colorado Water Conservation Board.

The Colorado River has been appropriately described as "troubled waters." Volumes have been written respecting the utilization, development, and control of these waters.

It is most opportune to take note of the water responsibilities of the seven Colorado River Basin states. On June 17 of this year the Bureau of Reclamation, under the Flood Control Act of 1944, officially submitted its report entitled "The Colorado River, a Comprehensive Report on the Development of the Water Resources of the Colorado River Basin for Irrigation, Power Production and other Beneficial Uses in Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming." Unless a pending application for an extension of time is granted, these states must submit their comments on the report not later than September 17, 1946. This report follows a preliminary one on the same subject submitted for the consideration of the states in the late fall of 1944. After the affected states submitted their several comments, the Bureau of Reclamation revised its conclusions and recommendations, and published them in the recently released report.

The Commissioner of the Bureau of Reclamation submitted the report to the Secretary of the Interior, who issued it under Section 1 of the Act of December 22, 1944 (58 Stat. 887). The commissioner's letter which accompanied the report contains the following statement:

> There is not enough water available in the Colorado River system for full expansion of existing and authorized projects and for development of all potential projects outlined in the report, including those possibilities for exporting water to adjacent watersheds. The formulation of an ultimate plan of river development will, therefore, require selection from among the possibilities for expanding existing or authorized projects as well as from among the potential new projects. Before such a selection for ultimate development can be made it will be necessary that, within the limits of the general allocation of water between Upper Basin and Lower Basin States set out in the Colorado River Compact, the Colorado River Basin States agree on sub-allocations of water to the individual states.

This means that before there can be worked out a comprehensive plan of development for the Colorado River Basin, the states have a major responsibility to fulfill. First, they must agree, if possible, upon an initial list of projects which may be authorized for early construction. The water for such initial projects must be well within the limits of any present or future allocation of water to the several states. Second, it is recommended by the Bureau that before any plan of comprehensive development can be effectuated, there must be an apportionment of water to the individual states of the basin. This means, so far as the Upper Basin states are con-

cerned, compact proceedings to apportion the 7,500,000 acre-feet of water apportioned in perpetuity to the upper Colorado River Basin by the Colorado River Compact, which was approved by Congress in 1928.

In accordance with the suggestion of the Bureau of Reclamation and in full recognition by the states of the advisability of an Upper Colorado River Basin compact, the five Governors of the Upper Basin states, together with their advisers and consultants, met at Cheyenne, Wyoming on July 22, 1946, and unanimously agreed to initiate compact negotiations. This first meeting was followed by the organization of the compact commission at a conference held at Salt Lake City, Utah, July 31, 1946.

The second meeting of the Commission, which is known as "The Upper Colorado River Basin States Compact Commission," will be held at Santa Fe, New Mexico, September 17 and 18, 1946. In the meantime a special engineering committee has been designated to set up a program of engineering studies for submission to the commission.

It should be noted that the Colorado River Compact divides the water of the basin at Lee Ferry. This brings a small portion of Arizona into the Upper Basin. The states of the Upper Division, as defined by the Colorado River Compact, are Colorado, New Mexico, Utah, and Wyoming.

The making of an Upper Basin compact entails two principal objectives. First, the 7,500,000 acre-feet of water, apportioned in perpetuity by the Colorado River Compact of 1928 to the Upper Basin for beneficial consumptive use, must be allocated among the five states lying wholly or partially within that basin; and, second, the four states of the Upper Division must agree upon the division of their several responsibilities to make the delivery of water at Lee Ferry. The Colorado River Compact provides that the states of the Upper Division "will not cause the flow of the river at Lee Ferry to be depleted below an aggregate of 75,000,000 acre-feet for any period of ten consecutive years reckoned in continuing progressive series beginning with the first day of October, next succeeding the ratification of this compact." In addition, there is involved the determination of responsibility of the Upper Division States at Lee Ferry, in accordance with the Colorado River Compact, to make deliveries of water to Mexico under the recently ratified United States-Mexico water treaty.

At this point it is well to note some of the essential features of the Colorado River Compact. This compact did not apportion water to the several states of the basin. It divided the water between the Upper and Lower basins—7,500,000 acre-feet were apportioned to the Upper Basin and 8,500,000 to the Lower Basin. The quantities of water over the 16,000,000 acre-feet thus apportioned was described as "surplus." This "surplus" was left for apportionment after 1963. But the compact further provided that if the United States thereafter recognized in Mexico any right to the use of water of the Colorado River system, such waters shall first be supplied from the "surplus." In the event the "surplus" should prove to be insufficient to meet this obligation to Mexico in any year, "then the burden of such deficiency shall be equally borne by the upper basin and the lower basin, and whenever necessary the states of the upper division shall deliver at Lee Ferry water to supply one-half of the deficiency. . . ."

In its recent report the Bureau of Reclamation estimates that before diversions were made by man the Colorado River annually carried an average of 17,720,000 acre-feet of water across the International Boundary into Mexico. It is further estimated that, under the Mexican treaty, Mexico will receive 1,500,000 acre-feet annually, leaving for consumption in the United States an average of 16,220,000 acre-feet, plus such water as was consumed under virgin conditions and natural losses preventable in part with full basin development. The average virgin flow of the river at Lee Ferry is estimated by the report to be 16,270,000 acre-feet.

The report shows that agriculturally the basin has advanced to the limit of its controlled water supply with only about 1.7 per cent of its total area, or 2,676,000 acres, under cultivation. Of this irrigated area 1,325,000 acres are in the Upper Basin and slightly more, 1,351,000 acres, are in the Lower Basin. Of the 39,145 farms in the basin, 20,667 are in the Upper Basin and 18,468 are in the Lower Basin. The report shows that the present hydroelectric development in the Colorado River Basin is 1,666,317 kilowatts installed capacity. This includes total installed, authorized or planned capacity, but does not include potential installed hydroelectric generating capacity.

The Colorado River has enjoyed extensive development, privately and federally financed. The impetus for large projects was given by the Colorado River Compact. Such projects as Boulder Dam, the All-American Canal, the Metropolitan Aqueduct, Colorado Big Thompson project in Colorado, and the Duchesne Tunnel of the Provo River project in Utah, the last two now under construction by the Bureau of Reclamation, show substantial development of one of the great river basins of the country. One hundred and thirty-four potential projects or units of projects are described in the report. These are in addition to the existing and presently authorized projects or extensions of them. In order for some of the states to utilize their equitable share of the waters of the river, it is clear that substantial and additional exportations from the basin to areas without the natural basin but in one or more of the Colorado River Basin states, are necessary. Poten-

tial projects of the latter type are mentioned but not described in the report. Under the Bureau's procedure such projects are described in the plan of basin development of the area to which the water is exported. It is estimated by the report that present water users in the United States deplete the virgin water supply at the International Boundary by about 7,120,000 acre-feet, leaving an average of about 9,100,000 acre-feet to meet expanding uses under authorized projects and to supply new demands for potential projects within the Colorado River Basin states.

Figures and estimates which are referred to in this article are based on the report of the Bureau of Reclamation. The report is under study by the state and whether these estimates will be fully supported by these states remains to be seen.

A meeting of the Colorado River Basin Committee of Sixteen was held at Salt Lake City on September 29 and 30, 1946. The purpose of this conference was to afford an opportunity for the Bureau of Reclamation to make a formal presentation of its report and to enable the members of the committee to ask questions and make such comments as they deemed advisable.

This committee was formed in 1938 and has functioned since that time. It was made up of two members from each of the seven Colorado River Basin states and two additional members representing the power allottees under the Boulder Canyon Project Adjustment Act. A short time prior to the Salt Lake meeting of the Committee, the California Colorado River Commission passed a resolution withdrawing the state of California from further participation in the work of the Committees of Fourteen and Sixteen. This resolution was accompanied by the formal resignation of the four California representatives, including the two appearing for the power allottees, both of whom were from Southern California. It was stated by the Californians that they did not deem it in the interest of their state nor for the best protection of their rights and interests in Colorado River water to continue membership in these basin committees. They expressed a willingness to attend the Salt Lake sessions as observers and to confer with other states of the basin, either separately or in groups, but not through these long-standing committees.

At its Salt Lake meeting the Committee of Sixteen, attended by representatives of all of the seven basin states except California, it was resolved to reorganize and to continue the work of the Committees of Fourteen and Sixteen under the name of the Colorado River Basin States Committee. It was further decided that the committee would be made up of two representatives appointed by the respective Governors of each of the Colorado River Basin states, the present members, except the California members who had resigned, to continue to function until further gubernatorial designation. The Governor of California was notified of this action and invited to designate representatives from his state. What action he will take is not now known. It was agreed that the next meeting of the committee would be held at Salt Lake City during the month of November, 1946.

It should be explained that the Committee of Fourteen and the Committee of Sixteen were virtually the same committee, except that under the procedure of the past when power matters were involved two members were added to represent the power allottees under the Boulder Canyon Project Act.

It is obvious from this summary that the states of the Colorado River Basin have an immediate responsibility of far-reaching import. It involves compact-making as well as a sane and sound consideration of proposals for the development, control, and utilization of the waters of one of the great rivers of the nation.

The Connecticut

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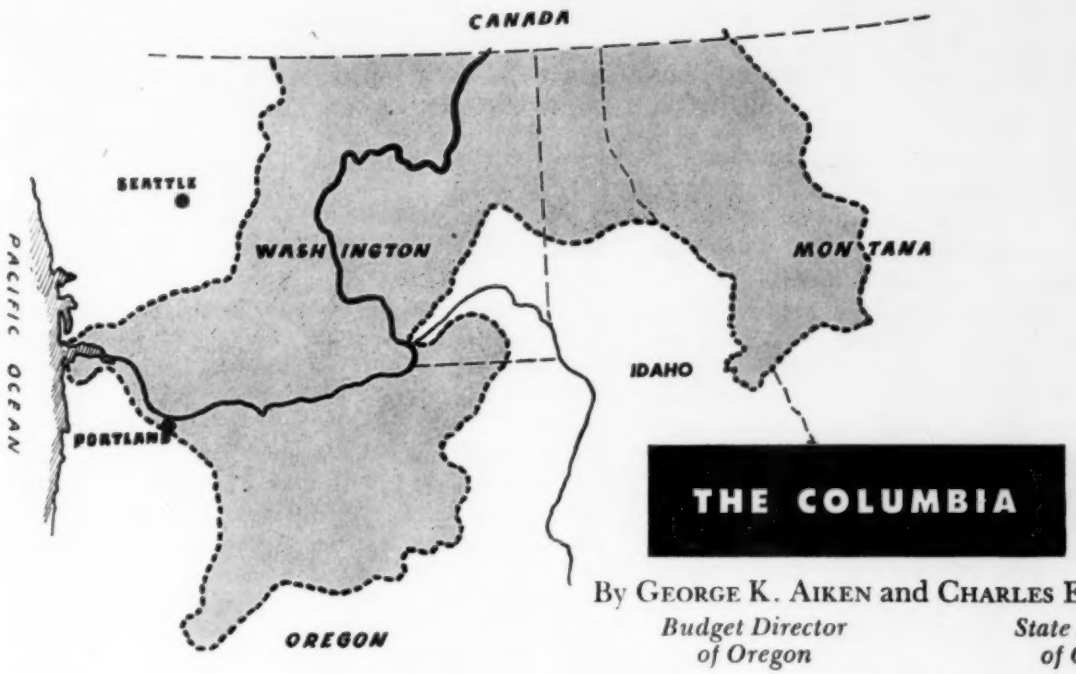
Power reservoirs and water supplies have been developed on tributaries of the river in Vermont and Massachusetts. Both hydro and steam power are generated in the valley, with emphasis on the latter. All of the generating facilities are interconnected and, by agreement among the various utility companies, power can be produced at all times at the sites best able to produce it under the conditions existing at any given time, and made available for use wherever it is needed in the valley. A number of possible sites for hydroelectric plants await economic justification for their development. The enormously increased demand for power in this heavily industrialized valley during the war years was met without any undue strain on generating plants and equipment. That this was possible was due to the foresight and long-distance planning of utility executives. The irregular flow of the Connecticut definitely limits its capacity to generate electricity on a dependable basis.

Thus far irrigation has been used but little in the Connecticut River watershed although research has demonstrated that better crops can be produced if the unusually well distributed rainfall in New England can be augmented by irrigation. The trend toward the more intensive cultivation of truck gardens, and potatoes and tobacco, may result in future years in a considerable use of Connecticut River water for irrigation purposes. In that case, it is possible that new interstate problems will arise to take the place of those which now seem to be on the way toward solution.



THE COLUMBIA

By GEORGE K. AIKEN and CHARLES E. STRICKLAND
Budget Director of Oregon — *State Engineer of Oregon*

ADMINISTRATIVE OFFICIALS and business leaders of Oregon long have recognized the need for adequate plans for the conservation and development of the state's water resources. Likewise, it has been realized that complete development of the state's possibilities can only be attained through a unified program for which not only the states and local agencies within the Columbia River Watershed, but also the Federal government must provide aggressive leadership and financial responsibility.

It is the confirmed belief that such development must be predicated upon mutual cooperation which recognizes the respective needs of the several states and the complementary nature of their basic resources. Oregonians are convinced that the foundation of a balanced economy which will support the future welfare of the entire region can be laid only upon a sound plan of development.

Since they were first settled the states of the northwest have been exporters of raw materials such as lumber, fish, and agricultural and mining products. They have been importers of manufactured goods. Comparatively, they have added but a fraction to the worth of the finished products made from their raw materials. Thus an adverse balance of trade has been a barrier to the development of the states of the northwest.

That this barrier can be removed was demonstrated during World War II. By taking advantage of the vast supply of hydroelectric power manufacturers of planes, ships, guns, machines, and many other materials of war demonstrated the possibilities for the balanced economy so urgently needed by the people of the Columbia Basin.

Inspired by what had been accomplished the Governors of Idaho, Oregon, Washington, Montana, and Wyoming gathered in Boise, Idaho on July 12, 1943, for the purpose of considering methods by which further development of the region might best be attained. To that end they organized the Northwest States Development Association, comprising the five states named above.

Each Governor named two representatives as members of an advisory committee charged with the task of considering the merits of projects proposed for the utilization of the waters of the Columbia River and its tributaries, and the coordination of their development.

The membership was later enlarged to include specialists in each of the subjects listed. Only the activities of the Association in working out a coordinated plan of conservation and utilization of the water resources of the region will be discussed herein.

The members of the Advisory Committee from each state prepared and filed with the Committee a report of projects in their respective states, together with detailed information that the committee needed in order to study and to coordinate the development in the Columbia Basin region. After careful consideration of all projects submitted, a report was prepared and submitted to the Pacific Northwest Development Association, together with definite recommendations as to development and policies.

At the request of the Advisory Committee the federal agencies engaged in planning within the Columbia Basin worked with the Committee and assisted in preparing the detailed information of projects.

At the meeting of the Northwest States Development Association held in Spokane, Washington, December 17, 1943, at which time the Governors of the five states were present, the report of the Advisory Committee was carefully considered. The governing principles for drainage basin development were adopted and a definite basic program recommended. Oregon is in accord with the program set forth in that report, a summary of which follows.

1. The development of the Columbia and related drainage basins must be basin-wide, region-wide. All parts of the region must share in the program and its benefits.

2. Upstream storage and upstream uses of water for irrigation, navigation, power, consumptive uses and other purposes must have high priority in order to secure upstream economic development, better regulation of stream flow, and repeated uses of water.

3. The multiple purposes principle must be followed in the interests of project feasibility, economy, and surest economic returns and broadest benefits. In the application of this principle, attention must be given to the highest or most vitally significant uses of water in various drainages. In general, domestic and irrigation uses will be considered most important.

4. The effective development of the drainage basins will necessitate strong local-state-federal cooperation, in plans, programs, design, construction, organization, and operation.

5. In the interests of national decentralization of authority, states' autonomy and democratic governmental functioning, each state and the group of states forming the region must assume a high degree of initiative and leadership in the development program. Cooperation in planning and programming drainage basin development must be followed by appropriate agreements or understanding governing the allocation and use of interstate waters.

6. The magnitude and complexity of the water resource development program make it imperative that the federal development agencies cooperate with each other and with the states in unifying such a program and in effectively carrying it out. The authority of the Federal government with respect to the national welfare and certain interstate development matters, and its greater financial and technical resources, are essential, if the development is to be successfully carried out. However, these must be joined with the rights, powers, and resources of the state in bringing about the most economical and widely beneficial development. The Federal government must aid the states toward the best use of water and land and toward the consummation of the covering interstate agreements.

The Delaware

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the people. The responsibility to develop programs for the proper use and conservation of the resources of the basin, both human and natural, lies primarily with the states within the basin. The Federal government because of its jurisdiction over navigation, will always exercise control, and influence any program for the basin. Therefore, we must work for the maintenance of a proper relationship between the Federal, state and local governments in promoting programs for the development of the Delaware. The concentration of population and industry, and the forward advancement of both urban and suburban communities, present a complicated problem for the building of the proper agency to solve the major problems, which seem to be pollution, domestic and industrial use of water, flood control, navigation, soil conservation and reforestation, and recreation. In the Delaware Basin, the officials, the press and the people know the need of a unified program to deal with those problems, and an agency exists which is developing such a program.

The Ohio

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were recognized on flood control projects. In a state like Ohio, which is virtually without natural lakes, recreational benefits may be very high.

The use of flood control reservoirs for generation of auxiliary hydroelectric power appears feasible in some areas, particularly on the southern tributaries. These are the areas, however, where such power is in competition with coal. Careful economic study is indicated. The present low interest rate reduces fixed charges on such installations, possibly justifying economically some installations which formerly had no economic justification. The increasing cost of coal will also be a new factor which must be considered.

The future of the Ohio River Basin industrially and agriculturally is inextricably dependent on the solution of its many water problems. These problems are involved and their solution is costly. The region, however, is the most richly endowed of any area in the United States. It is believed that the states, working cooperatively with federal assistance and coordination, can meet their water problems with resulting large benefits which will add to the value, beauty, and industrial and agricultural development of the region.

A National Water Policy

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reconciled so that the public may be assured that the interests of the states have been fairly protected and that the programs of competing agencies have been logically resolved. Voluntary coordination on the part of even well-intentioned groups is not a substitute for overlying coordination and integration by a group which will not benefit by the results or which will not be engaged in the final execution of the program.

The program for the control and development of the Missouri River Basin is a case in point. Here is an enterprise estimated to cost close to a billion and a half dollars. The detailed program for this control comes out of the joint agreement of two important federal agencies. Active and important construction is already under way and yet many competent observers have the uneasy feeling that the entire program needs to be carefully reviewed in order to assure the taxpayer that the development rests upon as logical a base as possible. This uneasy feeling persists, because many people doubt that the problems which it is proposed to solve by a compromise program involving expenditures of a billion and a half dollars could find logical solution in a quarrelsome debate.

On the State Level. Given an appropriate and continuing opportunity for participation in such discussions between various states and between the states and the Federal government, the states have an obligation to provide themselves with the highest quality of technical competency in order to present and to argue their views on a parity with the richer and more competently endowed federal agencies. Some states have already provided such high quality technical service and are in a position not only to debate the issues, but to shed considerable light on controversial aspects of each basin development. Many of the western states already find themselves in this favorable technological position, while the Interstate Commission on the Delaware River Basin in the East presents a good example of high technical competency on the interstate level.

The Compact procedure should be profitably developed by the states in combination with some federal coordinating agency. The history of the compact method is favorable. Unfortunately, it has not been used either as frequently or as competently as it should have been. It offers an excellent route by which to resolve important issues of allocation and payment.

It should not be forgotten, however, that the compact settles only problems as to the status quo for the future. It does not provide administrative machinery for design, construction, or operation, and it rarely, if ever, provides the necessary funds for such undertakings. Even with these limitations, however, it is a necessary prerequisite to future inter-state participation in basin development. It supplies that degree of conscious interstate responsibility which so frequently we have emphasized as a necessary accompaniment of state autonomy. Here again history points the way in the too few compacts. Stimulation toward their extension could easily be a national responsibility.

Other devices for raising the quality and level of state participation no doubt could be enumerated. It is important, however, only to emphasize the fact that, given the opportunity for participation, the states in turn must develop to the maximum their capacity for prompt and effective participation.

A national reviewing agency would have one of its major functions the development of facilities and processes by which continuing important state participation in studies and in decisions would be assured. These in turn would lead to logical bases for state participation in financing.

The Mississippi

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and the promotion of the legislation necessary to implement the plans. This department makes requests of the U. S. Engineers for consideration of the projects it originates, as well as projects sponsored by local interests, police juries (county government), and levee districts. An indispensable part of Louisiana's organized flood control work is its levee districts, set up and regulated by law for prosecution of the functions of government pertaining to flood control in their areas. The levee district constructs levees or dikes to prevent overflow of the streams whose alluvial valley it protects, carries on drainage and revetment, and performs other functions related to flood control. There are twenty such levee districts in Louisiana, and one in southeast Arkansas, which contains levees that protect Louisiana and by law are considered a responsibility of the state.

As we see it, although the Federal government reserves to itself the right to control all navigable waterways, this does not lessen the responsibility of the state in matters of flood control. It has been Louisiana's policy for many years to cooperate in every way with the Federal government's activities in the interest of flood control, navigation, and allied interests. Suggestions to the War Department, surveys to aid the U. S. Engineers, submission of general statistics and comprehensive plans create a more effective integration of the efforts of the Federal and state governments. We have found this policy satisfactory and effective, and no doubt shall continue to pursue it.

Around the States

Arkansas River Development

WITH THE SIGNING by the President of the Flood Control and the Rivers and Harbors acts of 1946 (Public Laws 525 and 526, 79th Cong., 2nd sess.) on July 24, the multiple-purpose plan for developing the water resources of the lower Arkansas River and its tributaries was given official endorsement. The plan was recommended by the Chief of Engineers, U. S. Army, and was actively sponsored by the Arkansas-Oklahoma Interstate Water Resources Committee, a joint state body authorized by the Governors of Oklahoma and Arkansas.

The two-state committee has agreed that flood control is the "paramount need of the whole Basin." Contingent upon satisfying that need it has strongly favored additional development to provide for navigation, irrigation, human and industrial consumption, hydroelectric power generation, production of fertilizer, recreation, and pollution abatement. The plan for navigation from which large benefits, especially lower rates for bulk freight, are expected to accrue to industry and agriculture includes a dependable nine-foot channel from the Mississippi River to the mouth of the Verdigris River at Muskogee, Oklahoma, and up the Verdigris River to Catoosa in northeastern Oklahoma, 530 miles distant.

Power development, considered to be secondary to the demands of flood control and consumptive use, is included at three proposed damsites in Arkansas and four in Oklahoma. Sediment control to reduce the problem of channel maintenance will be undertaken at dams in Oklahoma along the Arkansas mainstem and on its major western tributaries, the Cimarron and Canadian rivers.

Early opposition to the development plan in the semi-arid western part of the Arkansas Basin originated in the desire of those sections to retain and divert adequate water for irrigation purposes. Downstream advocates of development satisfied the reclamationists that the plan could operate successfully on flood waters and surplus water from upstream.

As adopted, the multiple-purpose plan for the Arkansas Basin will involve the building of some thirty locks and dams, the creation of a series of slack water pools formed by low-head dams and locks, and the development of an estimated 268,000 kilowatts of hydroelectric power (by the Arkansas-Grand rivers system). It is estimated that the so-called "first federal cost" of this plan for the Arkansas system will approximate $525,000,000.

Direct benefits anticipated from the development of the water resources of the Arkansas include savings in transportation costs, production of power, and low-cost production of fertilizer. The more intangible returns expected take the form of enhanced property values, saving of agricultural land by means of levees and bank stabilization, impetus to development of natural resources and recreational facilities, increased activity in commerce and industry.

Regional Meetings On Employment Service

DURING THE LATTER HALF of August and early September state officials met in a series of regional meetings to discuss the return of the employment offices to state administration.

Among the topics for discussion at the regional meetings were: ways and means for perfecting and expanding the employment service, organization and administration, facilities and special problems involved in the transfer of employment offices from federal to state administration, federal-state relations, and interstate relations.

Dates and locations of the meetings follow:

Northeastern Regional Meeting	Aug. 16	New York City
Western Regional Meeting	Aug. 23	San Francisco
Midwestern Regional Meeting	Aug. 30	Chicago
Southern Regional Meeting	Sept. 6	Memphis

Aviation

THE CIVIL AERONAUTICS ADMINISTRATION has announced its apportionment by states of the $43,260,000 carried in the 1947 Commerce appropriation bill for grants to aid airport projects in this country. After deducting about $2,000,000 for administrative expenses and $10,274,250 which will be allotted at the discretion of CAA, there remains $30,822,750 for apportionment in the states on the basis of population and area.

Legislation to permit immediate development of class 4 and larger airports under the Federal Aid Airport Act died without action in the Senate. The House had previously approved such a measure.

Veterans

S.2477 (PUBLIC LAW 679), signed August 8, is designed to remedy difficulties which have cropped up in administering on-the-job training benefits for veterans. These difficulties were outlined by General Bradley in a recent speech at Milwaukee, in which he declared that "the dishonest employer and the unthinking veteran have already infected the program in many states." S.2477 will permit a complete revamping of the program, and it specifically contains the following major provisions: (1) Permits reimbursement by VA of funds spent by state and local agencies in the approval, supervision, and administration of on-the-job training programs; (2) Requires the establishment of ceilings on combined wages and allowances; and (3) Establishes criteria which shall govern state approvals of on-the-job training courses. General Bradley said that the reimbursement feature of the bill would "go far toward assuring the veteran" that he will get the training to which he is entitled, and that the approval criteria would "end the severe differences that exist from state to state."

Washington Report

Public Works

On August 5 Reconversion Director Steelman issued Directive 128, ordering a 56-day moratorium on new federal construction. The order became effective August 6 and extends to October 1, 1946. In connection with the directive, Mr. Steelman noted that the $1,600,000,000 federal public works program would have to be cut by approximately $700,000,000 in order to conform with the President's anti-inflation budget. Steelman urged agencies making loans or grants to state and local groups to seek their cooperation in postponing public works construction wherever this can be done without jeopardizing health, safety, or essential services. To accomplish the purposes of the directive, Commissioner McDonald of the Public Roads Administration has urged state highway departments to keep federal aid highway expenditures at a minimum. Since the highway departments have consistently followed a policy of rejecting bids where prices were held to be too high, the current program is far below what would be normal under different circumstances. Continuation of this policy and even more rigid application was requested. The restrictions of Directive 128 do not apply to the provision of federal aid for highways where the federal government has already made commitments to the states through the approval of programs by PRA. Commissioner McDonald has advised state highway departments to this effect after discussion with the Office of War Mobilization and Reconversion.

Hospitals

S.191, the Hospital Survey and Construction Act, was enacted by Congress in the closing days of the session and was signed by the President August 13. As enacted, the measure contains the following major provisions: *Surveys*—$3,000,000 is authorized for hospital surveys and planning, to be allotted on a straight population basis with the federal government paying not more than one-third of the total expenditures. *Construction*—$375,000,000 is authorized at the rate of $75,000,000 per year for five years beginning with the current fiscal year, to be allotted in accordance with a formula based on population and average per capita income. Variable grants were deleted and the federal share of any construction project will be a flat one-third of the total cost. *Federal administration*—The Surgeon General will administer the Act and within six months must promulgate general regulations dealing with standards of construction and equipment as well as various other subjects. However, there will be no federal regulation of the operation and maintenance of hospitals once they are constructed. *State administration*—The bill requires that state construction plans be administered or supervised by a single state agency with the assistance of a state advisory council composed of representatives of both professional and consumer interests. There is a similar requirement during the period of survey and planning. *Hospital council*—A "federal hospital council," consisting of the Surgeon General and eight other members, has the responsibility of approving the Surgeon General's regulations governing state construction plans. The council would also be the body to which an appeal could be taken by States whose construction plans are disapproved by the Surgeon General. The council's other functions will be advisory. *Appropriations*—Before Congress adjourned it appropriated $2,000,000 (out of $5,000,000 authorized) for planning and survey grants to states. No appropriation was made for construction grants, but if the planning and survey program moves along well it would be possible to carry funds in a deficiency bill after Congress reconvenes in January.

Legislative Miscellany

H.J.R.225, to quiet state titles to submerged lands, has been vetoed by President Truman and the veto was upheld in the House on August 2. There were 139 members who voted to override the veto as against 95 to sustain.

H.R.7037, digested last month, was signed by the President on August 10. This measure contains the first major amendments to the Social Security Act since 1939. As enacted it freezes the payroll tax at 1 per cent for another year; increases the federal share of public assistance costs; provides special survivors' insurance for the families of veterans; and covers maritime workers under state unemployment compensation laws.

On July 30 Congress approved H.R.6932, to increase grants to the states for agricultural research work and to broaden the scope of such work, particularly with respect to marketing research. State experiment stations, extension services, and departments of agriculture and markets will participate in the expanded program.

S.2177 (Public Law 601), Congressional Reorganization Bill, was signed by the President on August 2. Among other things the bill will cut the number of standing committees of Congress by more than half, ban private bills, regulate lobbying and raise the salaries of Congressmen.

Congress Adjourns

Congress adjourned *sine die* on August 2 and, barring the calling of a special session, will not reconvene until the new 80th Congress meets next January. The current issue of the Council's Washington *Legislative Bulletin* contains a summary of major legislation acted upon by the 79th Congress as well as detailed information on legislation of interest to the states which was enacted during the closing weeks of the session.

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